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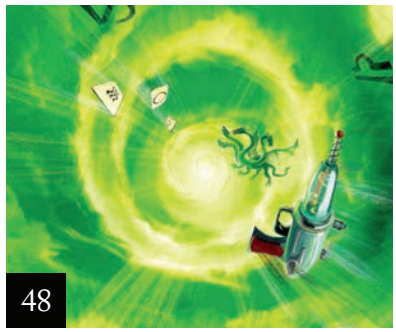
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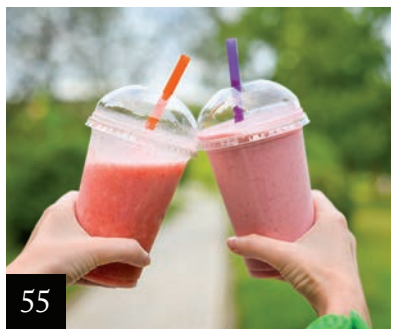
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Committee for Skeptical Inquiry
"… promotes scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims."

[FROM THE EDITOR

A Skeptical Hero's Origin Story

As a journalist for the *Daily Planet*, Clark Kent fought for truth. Using journalism to protect the people, he shined light into the darkest shadows. He even transformed into Superman when super powers were required. And like all great heroes, Superman has a fascinating origin story, harkening back to his birth on a dying planet.

Lately, I've been thinking a lot about Clark Kent, Superman, and origin stories. These thoughts started in October 2023 during my flight to CSICon while reading Kendrick Frazier's new book, *Shadows of Science*. Much like the book *The Demon Haunted World* was a key part of Carl Sagan's legacy, Ken's new book is one of his greatest contributions to the world.

We had to take this opportunity to publish Ken's words in Skeptical Inquirer, another of Ken's greatest contributions. The cover story comes from the opening of chapter five. Ken writes: "When I joined the staff of *Science News* magazine in Washington early in my career as a science journalist, someone handed me a nicely printed sheet of hints on writing science. On the back of this sheet was a small type, two-column section, 'Stories That Should Be Handled with Care.'"

You'll need to read the cover story to pick up the narrative from there. To help set the scene, though, I'll share that Ken began as the earth science editor for *Science News* in 1969 and served as editor-in-chief from 1971 to 1977. A defining moment in his story takes place in 1976, when he reported on the launch of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP). A cover of *Science News* in 1976 featured Ken's reporting of the formation of the organization, represented by the words "Challenging Pseudoscience." The cover art portrays a knight fighting a four-headed dragon, breathing four types of pseudoscience—flying saucers, astrology, telekinesis, and the Bermuda triangle. Shortly thereafter, Ken stepped down from his lead role at *Science News* to become the editor of SI in August 1977. Fittingly, the first Superman movie of my youth premiered in 1978.

Thus, Ken's origin story, as told in his book, is forever entwined with the origin story of SI and the Committee for Skeptical Inquiry (CSI). As a reader of this magazine, you already know that many other skeptical heroes, all with equally compelling origins, played key roles in the formation and development of CSICOP, now CSI. For me, learning more about Ken's story during my flight to CSICon helped give the conference even greater meaning. Whether you attended the conference or not, in this issue you'll experience the presentations through the journalistic eyes of Kenny Biddle, Paul Fidalgo, Susan Gerbic, Adrienne Hill, and Stuart Vyse. CSICon is the greatest place to see in person just how many skeptical heroes are continuing to fight for truth by shining light on the darkest shadows.

—Stephen Hupp

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Our Vision: A world where people value evidence and critical thinking, where superstition and prejudice subside, and where science and compassion guide public policy.
Our Values: Integrity, Courage, Innovation, Empathy, Learning, and Wonder.

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Skeptical Heroes Unite: CSICon 2023

STEPHEN HUPP

The first CSICon I attended was in Nashville in 2012, and my goal was to meet my skeptical hero, Scott Lilienfeld. The next year I brought my son to CSICon in Seattle with the goal of meeting our shared hero, Bill Nye. In 2018, I spoke for the first time as part of CSICon's Sunday Morning Papers in Las Vegas, with thanks to another hero, Ray Hall. And for CSICon 2023, I now get to report on the conference for the first time due to another hero of mine, Barry Karr. If you already read my editor's note in this SI issue, then you know I'm really leaning into the hero theme. I acknowledge that this theme can come off a bit cheesy, but it's really how I feel about all these skeptical inquirers (and I know I'm not alone). For your sake, though, I'll stop adding the word *hero* before every name mentioned, but please know that the following presenters regularly inspire me, which is the true definition of a hero.

The first day of the conference, Thursday, October 26, began with two workshops, each with limited seating (I note this only as a bit of advice if you're thinking about attending CSICon 2024; the workshops sell out quickly). As much as I would have liked to attend, I wasn't able to score a ticket to the "Magic for Skeptics" workshop by Ray Hall, Massimo Polidoro, and Richard Wiseman. Fortunately, Adrienne Hill attended and reports on the magical experience on our website (skepticalinquirer.org). On the other hand, and with many thanks to an act of generosity, I lucked out into receiving one unused ticket for the other workshop, "Investigating and Testing Extraordinary Claims," by Kenny Biddle and Jim Underdown. Biddle shared stories and strategies for solving mysteries, and Underdown discussed everything that goes into testing claims through the CFI Investigations Group. He also provided mock demonstrations of testing claims involving telepathy and dowsing. Overall, this dynamic duo shared many valuable insights.

In the evening, the welcoming reception was open to all attendees. Robyn E. Blumner, president and CEO of the Center for Inquiry (CFI), and Eddie Tabash, CFI's board chair, welcomed everyone with two primary messages. First, they both thanked everyone involved in pulling the conference together. Special thanks went to Barry Karr, CSI's executive director. Kendrick Frazier was also honored for his many decades of service (see more on him below). Second, the opening remarks made it clear that both CFI and CSI are here to stand up for science whenever and wherever it is being threatened. Following these remarks, Richard Dawkins gave his keynote speech.

Richard Dawkins: Science, the Jewel in Humanity's Crown

Early in his speech, Richard Dawkins proclaimed that "science is glorious." He emphasized how far we've come in our understanding of the world. Aristotle (born in 384 BCE), for example, believed the purpose of the brain was to cool the blood. He'd be shocked by all we now know about the brain. Similarly, Dawkins asked the audience to imagine how surprised the astronomer Archimedes (born in 287 BCE) would be to learn that humanity successfully sent the Rosetta spacecraft to land on a comet. He'd also marvel at the fact that we've detected the collision of two black holes from 1.3 billion lightyears away! Moreover, the greatest thinkers from previous eras would have their minds blown if they were to hold a smartphone. Dawkins wasn't belittling those early scholars but rather highlighting how science is a cumulative endeavor building on the greatest minds but also building on the culmination of millions of minds working together.

Throughout the talk, Dawkins's wonder and excitement about the frontiers of science were evident. "We love what we don't understand," he said, "because it gives us something to do." He highlighted several of the most complex and challenging topics of our day, such as subjective consciousness, quantum mechanics, the theory of relatively, the miracles that happen in our own cells, and the fundamental questions of existence. He also addressed the "tyranny of the discontinuous mind," arguing that most variables occur on a continuum rather than representing a dichotomy. He also acknowledged that some variables can fairly be characterized as dichotomous. In particular, he elaborated on controversies summarized in Jerry A. Coyne and Luana S. Maroja's SI article (July/August 2023), titled "The Ideological Subversion of Biology." Overall, Dawkins's talk was a celebration of science. He noted that we humans are the only species to know the scientific method, making science the "jewel in humanity's crown." (The full speech was printed in the February/March 2024 issue of *Free Inquiry*, SI's sister magazine.)

Stuart Vyse: Start Making Sense

Stuart Vyse gave the first Friday morning presentation, based partly on his new book, *The Uses of Delusion: Why It's Not Always Rational to Be Rational.* He opened by saying "not all unreason

Stuart Vyse

Bill Nye receives The Richard Dawkins Award from Richard Dawkins

is unreasonable," meaning that there are times when delusions actually help us out. By way of example, Vyse shared a personal story in which he mused with a romantic partner that they both could have fallen in love with "any number of people" rather than being connected as "soul mates"—an unforced error likely made by many a skeptic. The relationship ended soon thereafter. This funny tale then set up the subsequent presenters of the conference to publicly declare their partners to be their soul mates—a useful delusion (according to Vyse, that is).

Vyse acknowledged that even though there are some situations in which delusions are beneficial, oftentimes they can be disastrous. Vyse posed a question from the point of view of skeptics, "Where should we place our efforts?" He then described three groups of believers in false beliefs. First, the true believers have already dug in, and it will be quite difficult to change their minds. Second, the nonbelievers "are doing just fine, thanks." Last, there are the half-believers. They, for example, pass along a chain mail—not because they truly believe it will provide benefit but because it takes little effort to pass along; they might say, "I don't want to take a chance" and risk losing out on the potential benefit, even if it is a longshot. According to Vyse, one of the best places for skeptics to focus attention is on the people who exploit the believers (such as using sting operations to expose celebrity psychics). He also urged skeptics to target those who aren't yet committed (such as through the work done on the useful website facilitatedcommunication.org). Finally, he urged skeptics to give special attention to children, and he praised the work done by CFI's Teacher Institute for Evolutionary Science (TIES). With the balance of humor and insights, Vyse's presentation set the tone for every presentation to follow.

Bill Nye Receives the Richard Dawkins Award

On Friday evening, Bill Nye received the Richard Dawkins Award, given each year "to a distinguished individual from the worlds of science, scholarship, education, or entertainment, who publicly proclaims the values of secularism and rationalism, upholding scientific truth wherever it may lead." Dawkins cited Nye's science communication through various shows, stating that "no one exemplifies this commitment better than Bill Nye." Dawkins then shared a quote from Nye, "Science is the best idea humans ever had." Before handing over the award, Dawkins even went so far as to proclaim, "Bill Nye for President!" indicating that we need science-minded leaders. The award itself included an inscription with a quote from Carl Sagan: "Our passion for learning is our tool for survival."

In turn, Nye credited Dawkins's books, with special praise for *The Ancestor's Tale*, saying to Dawkins, "You have been a tremendous influence on me, and to get this award from you means more than I can readily say." Nye then reflected, "We are living in an extraordinary time." Sarcastically adding, "You know, if you like to worry about things, this is great." However, he encouraged us to stay optimistic, saying, "This is the most exciting time in human history … we are making more discoveries, more rapidly. We are engaging more people. We are raising the standards of living for more women and girls than ever in history, and so let's go, people. Let's get it done." Overall, Nye's responses during the interview exuded this type of optimism. "Working together, with the process of science, we can celebrate the PB&J (the passion, beauty, and joy) and the JoD (the joy of discovery) and we can, my friends, change the world!"

Ruth Frazier Accepts the Balles Prize on Behalf of Kendrick Frazier

Each year, CSI presents the Robert P. Balles Annual Prize in Critical Thinking. This year Ruth Frazier accepted the prize on behalf of her late husband, Kendrick Frazier. Within this SI issue, you can read more about Ken in my editor's note and through the two excerpts from his new book, *Shadows of Science*, that serve as our cover story. At CSICon, the Sunday morning ceremony began with a heartwarming video montage of Ken's media appearances. Then, before handing the award to Ruth, Paul Fidalgo, editor of *Free Inquiry*, reflected on Ken's legacy by saying, "Before there was

Ruth Frazier accepting the Balles Prize on behalf of the late Kendrick Frazier from Paul Fidalgo

Left to right: D.J. Crossland, Adrienne Hill, Katie Dyer, Rob Palmer, and Rodney Schmaltz

a CSICon, a Center for Inquiry, a Committee for Skeptical Inquiry, a CSICOP, or a Skeptical Inquirer, Kendrick Frazier was an editor at *Science News*. … He went on to cover the birth for what this organization was to become, the Committee for the Scientific Investigation of Claims of the Paranormal." This ultimately led to Ken editing Skeptical Inquirer for forty-five years, but he never got bored. Fidalgo added, "Legions of luminaries, scholars, and activists have built entire careers, movements, and lives upon the foundations laid by Ken at Skeptical Inquirer."

Upon accepting the award for Ken, Ruth said, "Ken would have been so gratified—okay, and a little embarrassed—of an award like this because he did what he did for many of you who were the first-time attendees of this wonderful conference." Speaking directly to the new attendees, she added, "You are the ones that Ken was writing for as well, so he could take the words of the great scientists, philosophers, the economists, all the people that wrote for Skeptical Inquirer, and make it understandable."

Ruth shared that *twenty years* before Ken's death, he'd been given only *ten months* to live due to cancer, but his treatments extended his life for so much longer. In the hospital, just before his death, he said to the doctor, "I've had a glorious twenty years. I've accomplished everything I wanted to do. I've got to see my children marry and give us grandchildren. I've had a perfect twenty years." Ruth also highlighted the legacy of their seven grandchildren and two children—Christopher Kendrick Frazier was in the room (their daughter Michele Lenore Frazier Baldwin died in 2012 due to cancer, but only after setting a world record in paddleboarding to raise money and awareness related to her illness).

Ruth wrapped up by saying, "Ken died with his laptop near, and he finished the book that is really a love letter to science." Continuing her optimistic tone, she emphasized that the conference attendees are part of something important and vital. Ken believed that the world is better off now than it has been in all the past. Ruth ended by saying, "We must be even more vigilant than ever before to keep the crap out."

Sunday Morning Papers

I'm always excited to attend this last set of presentations, moderated by Ray Hall and Natalia Pasternak. First up, Rob Palmer gave a talk about Havana Syndrome, youth poisonings, and a monkey-human hybrid. The common thread connecting these stories is the role that the Guerilla Skeptics on Wikipedia (GSoW) plays in making sure that Wikipedia covers these topics in a science-informed way. Next up, Adrienne Hill described the investigations and myth-busting she's done regarding Winchester Mystery House. Through GSoW, she's helped set the record straight on the house and the woman who built it. In the third talk, Rodney Schmaltz and D.J. Crossland shared the results of a study conducted with college students. The personality trait of selfishness and, more broadly, the "light triad" (i.e., Kantianism, humanism, and faith in humanity) were associated with belief in pseudoscience. Finally, in a meme-filled presentation, Katie Dyer shared results from a soon-to-be-published study conducted about online learning in the college classroom. Prior belief in common sense negatively predicted how well students did in the class. Overall, like all the presentations at CSICon, these Sunday Papers were a joyful celebration of science and science communication.

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I'd like to close by adding that it's hard to imagine a better emcee than George Hrab. His humor really helped tie the whole conference together in a delightful way. I'm also thankful to Karl Withakay for letting us use so many of his excellent photos. Now it's time that I turn you over to other reporters. They all did an amazing job of sharing their experiences involving the other wonderful presentations. I'm already looking forward to the next CSICon. I hope to see you there! ■

Stephen Hupp is the editor of Skeptical Inquirer.

The Highs and Lows of Skeptical Education

STUART VYSE

Stephen Hupp

As a psychologist and former college professor, I'm always drawn to the CSICon talks about teaching, because so many of the skills needed to combat the onslaught of crazy stuff in the world do not come naturally. You have to learn them. Education is the key to separating the wheat from the chaff—or the woo from the crap. This year there was a wonderful superabundance of talks about child development and education, ranging from infancy to college. Below are my summaries of the best nuggets from four of these talks.

Stephen Hupp Debuts as New Editor of Skeptical Inquirer

Psychologist Stephen Hupp appeared on the CSICon main stage for the first time as the new editor of Skeptical Inquirer magazine and gave a hilarious and informative talk on pop psychology myths. Hupp's talk was scheduled well before he knew he would be the editor of SI, but he used the first few minutes of his time to acknowledge people who had preceded and inspired him. Most importantly, he recognized the legacy and immeasurable contribution of Kendrick Frazier, the longtime editor of SI who died in November 2022, and thanked Frazier's wife, Ruth, whom Hupp interviewed in the November/December 2023 issue of the magazine. Hupp also cited psychologist and former CSI fellow Scott Lilienfeld as an important mentor and inspiration.

The bulk of Hupp's talk was based on his new book with Richard Wiseman, *Investigating Pop Psychology Pseudoscience, Fringe Science, and Controversies* (Routledge, 2023). Following a developmental path from conception to death, he regaled the audience with the truth about many common myths of pop psychology, including the following:

- Fertility improves after the couple adopts a child.
- Belly shape predicts sex of fetus—ball for boy, watermelon for a girl.
- All kids go through the "terrible twos."
- Bedwetting is an early sign of hysteria.
- Imaginary friends are a problem.
- D.A.R.E. prevents drug use.
- Infant simulator dolls prevent pregnancies.
- Most people with serious mental illness are violent.
- Most people experience a mid-life crisis.
- Brain training programs are the best way to prevent cognitive decline.
- When someone faces the prospect of their own death, they go through standard stages of emotions.

Hupp's talk was a rollicking myth-busting introduction to the new leadership of the world's foremost magazine of science and reason, and it was clear to all in attendance that Skeptical Inquirer is in very good hands.

Seema Yasmin on Why Media Literacy Isn't Being Taught

Physician, author, and director of the Stanford Health Communication Initiative, Seema Yasmin took to the main stage to sound a clarion call for information literacy and education in the ways of misinformation. Drawing on material from her recent book, *What the Fact?! Finding the Truth in All the Noise* (Simon & Schuster, 2022), Yasmin highlighted the dangers of fake news.

After welcoming the audience to Media Literacy Week (October 23–28, 2023), Yasmin began with a dramatic example of the strength of those opposing media literacy and education. She announced that she would be publishing a new children's book next year and had been told that she may need to hire a bodyguard when the book launches. Why? Because the title of the book is *The ABCs of Queer History*. LGBTQ literature is a hot-button issue at the moment, and book bans are on the rise.

When it comes to media literacy, the problem is enormous. The average youth (between the ages of eight to eighteen) spends nearly eight hours a day exposed to media—more than fifty hours a week. Despite this level of ex-

Seema Yasmin

posure, 55 percent of youth are not even moderately confident in their ability to spot false information. Furthermore, the stakes are very high. One-in-two Americans believe at least one conspiracy theory. Conspiracy theories abound when media literacy and critical thinking are not taught. (Yasmin confessed that she had once been prone to conspiracy belief herself, so she tries to avoid "dunking on" conspiracy believers.)

The good news is that eighteen states mandate the teaching of some form of literacy education in schools. The bad news is that *only* eighteen states mandate media literacy—and that many of them are not doing a good job. According to Yasmin, teachers are hungry to teach this material because their students are eager to talk about fake news and the credibility of news sources. By contrast, according to Yasmin, Finland is "winning the war on fake news"; media literacy is taught there as a life skill.

Near the end of her talk, Yasmin pointed to several things we can do to combat misinformation:

- Use a multi-layered approach; the more efforts the better.
- Teach psychologist John Cook's five techniques of science denial: Fake experts, Logical fallacies, Impossible expectations, Cherry picking, and Conspiracy theories (FLICC).
- Study strategies for fighting misinformation.
- Get granular: Yasmin reported that librarians have discovered that, when they receive complaints about books, simply asking what page the offending material was on typically made many challenges disappear.
- Support organizations that are protecting access to information (PEN America, American Library Association, etc.).
- Read banned books.

Yasmin ended her talk with an impassioned plea for all of us to get involved in combatting misinformation: "Think of one thing you can do to further the cause. It is so important!"

Woo in the U Panel Discussion

If you think the world of higher education would be a land of reason and logic, think again. There are a bunch of crazy ideas floating around college campuses—and not just among the students. Thankfully, skeptics are on the case. In the panel discussion "Woo in the U," professors Natalia Pasternak (Columbia University), Kathleen Dyer (California State University, Fresno), and Ray Hall (California State University, Fresno) reported from their campuses and described what they were doing to fight back.

Natalia Pasternak: Skeptical Activism in Brazil

Natalia Pasternak described the situation in Brazil: "There is a lot of bullshit that students believe in, and there is a lot of BS being taught." Pasternak confirmed that Brazilians are proud of their nationalized medicine program, but unfortunately it offers many unsupported medical and psychological therapies. Homeopathy, traditional Chinese medicine, and reiki are all taught in Brazilian medical schools, and grant money is allocated to study these non-evidence-based methods. Pasternak said that Freudian psychoanalysis is a particularly big problem. Sigmund Freud is credited with launching the field of psychotherapy, but his system of id, ego, and superego, as well as his theory of psychosexual development, are now understood as pseudoscience—an elaborate invention without any supporting facts. Nonetheless, psychoanalysis is extremely popular in Brazil.

On the personal level, Pasternak has done much to fight this kind of nonscientific claptrap. During the pandemic, she became a highly visible commentator in discussions of the virus and vaccines. More recently, with coauthor Carlos Orsi, she published the book *Que bobagem! Pseudociências e outros absurdos que não merecem ser levados a sério* (*What Nonsense! Pseudosciences and Other Absurdities That Do Not Deserve to Be Taken*

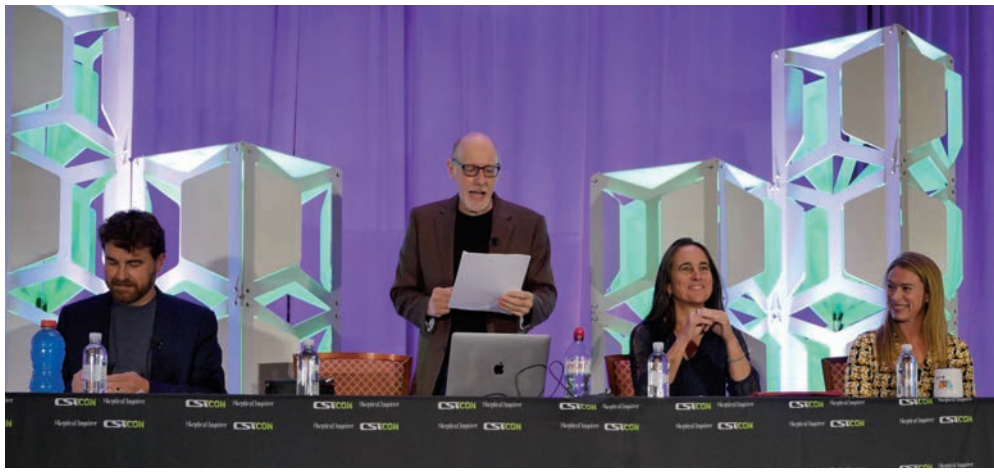
Left to right: Natalia Pasternak, Kathleen Dyer, Raymond Hall

Seriously) (Contexto, 2023), which was an enormous bestseller in Brazil. She is also the head of Brazil's biggest skeptic group, Instituto Questão de Ciência (https://iqc.org.br/). In addition to all this, Pasternak is teaching courses in critical thinking both at Columbia University in the United States and the Fundação Getulio Vargas in São Paulo, Brazil.

Kathleen Dyer and Ray Hall: Teaching a Critical Thinking Class

Kathleen Dyer teaches in the Child and Family Science Department and has discovered that students express many false ideas about children and families. As many as 80 percent of students believe that sugar makes kids hyper, praise raises self-esteem, men and women communicate differently, birth order has real effects, and people have different learning styles. Half of her students believe that facilitated communication works and that the teen pregnancy rate is climbing. So her college students—who are probably representative of college students at other institutions—are in desperate need of critical thinking tools and some better sources of information.

Ray Hall described a large-scale study that he and Dyer published in 2018 showing that education could have a strong effect on college students' acceptance of "epistemically unwarranted beliefs"—but only if it comes in the form of courses that specifically target these non-evidence-based beliefs. Specifically, they found that a targeted critical thinking class produced substantial reductions in belief in the paranormal, health pseudoscience, extraordinary life forms (e.g., Bigfoot), religion, conspiracy theories, and ghosts. These results were compared to a research methods class and a general education class, neither of which had much effect. The research methods class produced a small but statistically significant reduction in paranormal belief but had no effect on the other unsupported beliefs. The general education class had no effect on any of the beliefs. Even more impressive, critical thinking instruction was powerful enough to generalize to other unsubstantiated ideas not covered in the course.



Left to right: Stephen Hupp, Richard Wiseman, Bertha Vazquez, Melanie Trecek-King

One of the most important messages from these professors was the need for instruction that specifically targets these false beliefs. Echoing an idea that late CSI Fellow Scott O. Lilienfeld often expressed, Dyer and Hall stressed the importance of refuting bad ideas to make room for better ones.

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Speaking of Lilienfeld, Pasternak, Dyer, and Hall are all co-organizers of the newly formed Lilienfeld Alliance for the Teaching of Rational Skepticism in Higher Education, which met for the second time at CSICon 2023. The group is compiling a collection of syllabi of critical thinking courses and has identified several projects aimed at promoting the teaching of college courses that expose pseudoscience.

The session was followed by a lively Q&A, with many comments and questions coming from other professors in the audience. The final question was posed by none other than Bill Nye: "Do psychology professors teach the history of the science?" Answer: "Yes!"

Young Skeptics Panel Discussion: A Magical Experience

As is often the case at CSICon, the education of children was an important focus of attention at the 2023 meeting. (Cue Whitney Houston: "I believe the children are our future/Teach them well and let them lead the way.") Nowhere was the focus on children more obvious than the panel discussion "Young Skeptics: Creating the Future," featuring Richard Wiseman, Bertha Vazquez, Melanie Trecek-King, and Stephen Hupp.

Bertha Vazquez on Cell Phones and Caring

Bertha Vazquez, CFI's education director, has recently retired after a long career as a biology teacher in the Miami-Dade County Public Schools. She is the director of CFI's highly successful Teaching Institute on Evolutionary Science (TIES) program that provides support and training for science teachers throughout the country. She spoke about the firehose of misinformation coming at young people through their phones and other media, much of it created by well-funded artificial intelligence–driven sites designed to attract clicks. This is an enormous challenge, and she stressed that 1) we are not doing enough to teach kids how to detect false information; and 2) teachers can't do it all; skeptics must step up to take some of the burden. As a dramatic expression of the challenges teachers face, Vazquez said she decided to retire when she came close to throwing a student's cellphone against the wall—an act that might have gotten her fired and jeopardized her pension.

Vazquez spoke about CFI's Science Saves initiative (https://sciencesaves.

org/) aimed at promoting an appreciation for the many ways that science has improved our lives. ScienceSaves has efforts aimed at fighting pseudoscience, and it runs the #ScienceSaves project that offers a $10,000 college scholarship for the student who produces a short video that best answers the question, "What has science done for me or someone I know?" Finally, ScienceSaves is working to make March 26 National Science Appreciation Day, a project started by Todd Stiefel of the Stiefel Freethought Foundation. The date was chosen because on March 26, 1953, Dr. Jonas Salk revealed his successful vaccine for polio. So far fourteen states—in red and blue areas of the country—have proclaimed March 26 Science Appreciation Day in 2024.

During the Q&A period that followed, Vazquez offered important advice for those who hope to teach young people, and one of the more memorable quotes from the session: "They have to know you care before they care what you know."

Richard Wiseman's Three Ideas

Hertfordshire University (U.K.) psychology professor, magician, and author Richard Wiseman served as the emcee of the panel discussion, and he spoke about three highly attractive media-savvy ideas. First, he described his Quirkology YouTube channel—named after his 2007 book, *Quirkology: How We Discover the Big Truths in Small Things* (Basic Books). On his Quirkology channel, Wiseman produces short "Science Magic" videos that are extremely popular. The channel has 2.4 million subscribers, and some of the individual videos have been watched over forty million times. This kind of popularity is a remarkably effective way to promote the excitement and fun of science.

Wiseman's second idea was the interactive book-length comic *Hocus Pocus*, a collaboration with Rik Worth, Jordan Collver, and Owen Watts. In typical Wiseman fashion, *Hocus Pocus* presents magic in combination with science and critiques of the paranormal. Although it is also appropriate for adults, *Hocus Pocus*'s comic book format makes it particularly attractive for children.

Finally, during the pre-vaccine period of the COVID-19 pandemic, with the help of game designer Martin Jacob, Wiseman developed a free online game titled "Can You Save the World?" The game taught youngsters about social distancing and mask use at a time when these practices were very important. The game is still available online, and like Quirkology and *Hocus Pocus*, it is very likely to appeal to younger gamers.

If that were not enough, Wiseman announced that he has a new book for children coming out in 2024, *Magic Your Mind Happy: Amazing Magic Tricks for Happiness, Confidence and Calm.* All of which leads to the obvious conclusion: this Wiseman guy is unstoppable!

Melanie Trecek-King: Improving Science Education

Melanie Trecek-King is relatively new to the skeptical scene, but she has already made a big impact. She is an associate professor of biology at Massasoit Community College in Brockton, Massachusetts, and the power behind the ThinkingIsPower.com website and multi-media campaign. She has appeared on Skeptical Inquirer Presents and has written articles for Skeptical Inquirer. When she's not producing online videos about science, pseudoscience, and critical thinking or speaking at skeptical conferences, she is teaching science to her students in Massachusetts.

Trecek-King's panel topic was about how most science teachers—including herself earlier in her career—are doing it all wrong. The traditional college biology textbook gives a cookbook presentation of what scientists do—approximately four pages on the methods of science. This brief introduction is followed by chapter-after-chapter of scientific discoveries in need of memorization. Trecek-King has greatly revamped her courses to spend more time showing how science separates truth from superstition. She also covers psychological biases and critical thinking and their relationship to the task of scientific discovery. She uses the famous blue and black versus white and gold dress illusion to show the limits of individual perception, and she discusses the European and colonial American witch trials as examples of the horrors committed by people in the name of a false belief. Finally, echoing comments made by Bertha Vazquez, Trecek-King stressed the need for greater emphasis on information and science literacy. It is vitally important to give students the tools to distinguish between reliable fact-based sources of information and the usual garbage.

Stephen Hupp: Psychologist, Editor, and Magician

In his day job, Stephen Hupp is a professor of psychology. He is also the new editor of this magazine, and, as it turns out, a magician. Using many examples drawn from Skeptical Inquirer, he talked about how children can be raised to appreciate science. As an example, Hupp recounted how science fair projects can be used to teach critical thinking and skepticism. He also emphasized behavioral skills training (i.e., modeling, instructions, rehearsal, feedback) as the best way to teach new skills.

The most exciting part of Hupp's presentation came at the end of the panel discussion when he revealed that—completely undetected by most people in the room—he had performed Wiseman's "Colour Changing Card Trick" (SPOILER ALERT: search for that title on YouTube to watch the trick first before reading further). While the other panelists were speaking, Hupp had changed his shirt from blue to bright red, his sports drink bottle from blue to red, his power bracelet from black to silver, and the curtain background behind the panelists from blue to green. The trick was a tremendous success and was greeted by resounding applause. Never one to pass up an opportunity for a good joke, Wiseman quipped, "And while it's been happening, I've removed my pants!" ■

Stuart Vyse is a psychologist and author of *Believing in Magic: The Psychology of Superstition*, which won the William James Book Award of the American Psychological Association. He is a fellow of the Committee for Skeptical Inquiry.

What I Learned: Disgust, Misinformation, and the Lemon Test

KENNY BIDDLE

CSICon 2023 has come and gone, and I'm still buzzing from all the excitement. This was my sixth conference attendance, and once again it delivered an amazing speaker lineup, presentations full of exciting information and funny jokes (yes, skeptics can be funny), and a reunion of our extended family. I've had the opportunity to write about my conference experiences in the past, so when asked again to cover a few of the presentations, I didn't hesitate.

Erika Engelhaupt: How Disgust Meddles with Our Minds

Erika Engelhaupt is a freelance science journalist who has written for *National Geographic*, NPR, *Science News*, and more. Her presentation, "Disgust: How an Overlooked Emotion Meddles with Our Minds," was one that caught my attention when I first saw the schedule. To be honest, in the past I never gave this emotion much thought. If I found something disgusting, I simply moved on. Engelhaupt gave me more to consider.

After describing the basics of disgust, Engelhaupt dove into whether it was an innate emotion or a learned behavior. Turns out, it's both, just with varying degrees of sensitivity. One (funny) example came from poop; yes, the number two that we all do. The question was posed, "How come little kids will play with poop, but the rest of us will universally agree that poop is gross?"

What really interested me was how this emotion influences our decisions on health, food, and politics and can also lead people to accept medical myths and irrational fears. As Engelhaupt put it, "Disgust can make us less than rational." To further make this point, Engelhaupt turned to magical thinking. First, we were shown a delicious piece of chocolate that was, unfortunately, in the shape of a pile of dog poop (law of similarity). This got quite a few laughs and comments from the audience such as, "Ewww!" and "Oh, hell no!" The shape of the chocolate triggered the emotion of disgust based on the idea that "if it looks like dog poop, it must be dog poop, even though rationally we know it's chocolate."

On a more serious side, Engelhaupt circled back to poop (I'm sensing a theme here) with fecal transplants, or fecal microbiota transplantation (FMT). Research has shown this procedure can control an infection called *Clostridium difficile* by adding healthy bacteria into the recipient's intestines. However, the idea of putting someone else's poop in our body may trigger disgust, thus hindering further development of this treatment.

Erika Engelhaupt

Mick West: Why Is the Government Studying UFOs?

Next up was Mick West, our go-to expert when it comes to "leaked" UFO footage. West is the founder of Metabunk (a mystery solving online community) and columnist for Skeptical Inquirer. His presentation, "What's Next—The Men in Black? Why Is the Government Studying UFOs?," delved into the history of modern UFO "research" (and the people involved) to give us a better perspective on the current

Mick West

situation of why the U.S. government is so interested in investigating UFOs … umm, I mean … UAP.

The recent situation includes AARO (All Domain Anomaly Resolution Office), an official office of the Department of Defense, headed by Sean Kirkpatrick. Even though they've repeatedly reported "no evidence of E.T.s," nobody seems to believe them (that got West a laugh from the audience). Despite this official department and its findings, others have jumped on the bandwagon, such as NASA's formation of a panel in October 2022 to study UAP (which also found no evidence of UFOs) and no fewer than three congressional hearings on UFOs (May 2022, April 2023, July 2023) and UAP, the most recent one showcasing "whistleblower" David Grusch.

After the summary, West began detailing the history of the modern UAP government interest, starting with Jacques Vallee, one of the most famous UFO researchers in the world (the real-life model for Lacombe, the researcher portrayed by François Truffaut in Steven Spielberg's *Close Encounters of the Third Kind*), and includes a cast of fourteen other characters repeatedly showing up in various government agency names. From there, West took us on a wild ride from the infamous (yet truly uninteresting) Skinwalker Ranch, a supposed supernatural ranch on 512 acres located just southeast of Ballard, Utah, to a 2017 *New York Times* article, to a skillful breakdown of ten alleged UAP videos (which West did with ease).

Melanie Trecek-King: A Life Preserver for Staying Afloat in a Sea of Misinformation

After a lunch break, we returned for Melanie Trecek-King, founder of Thinking Is Power and one of CSI's newly elected fellows. Trecek-King presented "A Life Preserver for Staying afloat in a Sea of Misinformation," which provided an overview of how she teaches her students the skills to evaluate claims, using critical thinking, information literacy, and science literacy.

The bulk of Trecek-King's talk focused on a toolkit she developed, FLOATER, which appeared as the cover story in the March/April 2022 issue of this magazine. FLOATER (Falsifiability, Logic, Objectivity, Alternative Explanations, Tentative Conclusions, Evidence, Replicability) is built on the work of James Lett's 1990 book *A Field Guide to Critical Thinking*.

Over the next thirty minutes, Trecek-King touched on each step of the FLOATER kit and provided various examples. She began with Falsifiability, explaining that it must be possible to think of evidence that would disprove the claim. I've found this first step is often difficult for those with paranormal beliefs to understand (usually because they "know" their belief is true). Amid several humorous examples that included "is it possible to fart out your soul?" and "cats make the best pets," Trecek-King explained that "some of our most strongly held beliefs are based on things like subjective values. And we try really hard to protect them, and we do this by finding evidence to support them. But

Melanie Trecek-King

Eugenie Scott

you want to ask yourself: Can I even prove this wrong?"

Moving through the list, another step that stood out to me was Trecek-King's breakdown of Tentative Conclusions (the "T" in FLOATER), the basic idea that a conclusion can change with new evidence. She explained that this step is often a difficult one for her students to grasp, because "they're used to considering knowledge as either black or white, right or wrong, true or it's not true." But it's most often not that clear cut.

Trecek-King went on to explain that skepticism proportions the conclusion based on the evidence we have. With more evidence, we increase our certainty and allow ourselves to change our minds. "In science when we say, 'it's a theory,' we don't mean 'it's *just* a theory,' we mean 'this is as sure as we're going to get with explanations (based on the evidence). Can it change? Yes! Being able to change your mind with evidence is commendable."

Eugenie Scott: Here Come the Creationists (Again)

Finally, I had the pleasure of hearing Eugenie Scott address a serious concern: creationists. Scott is a physical anthropologist, serves on the Board of Trustees of Americans United for Separation of Church and State, and is a CSI fellow. Her presentation, "They're Back? Here Come the Creationists (Again)," was likely one of the most worrisome, because it demonstrated a breakdown of the separation of church and state.

Scott began with a brief history and trends of creationism beginning in 1970, showing several peaks in interest with the last being in 2014 when Bill Nye debated well-known creationist Ken Ham. After that, interest in creationism declined steadily. However, Scott covered several museums that have opened over the years as well as legislation that's attempted to get creationism taught in schools.

In the past, these attempts have been shot down because of the Establishment Clause in the First Amendment: "Congress shall make no law respecting an establishment of religion or prohibiting the free exercise thereof." Since 1971, this has been decided by *Lemon v. Kurtzman*, which decided that states could use tax money to assist religion (in schools) only if (1) the primary purpose of the assistance is secular, (2) the assistance must neither promote nor inhibit religion, and (3) there is no excessive entanglement between church and state. The "Lemon Test," as it has come to be known, has kept creationist ideas from being entangled in schools.

However, Scott's talk focused on a very disappointing ruling. In June 2022, in the case of *Kennedy v. Bremerton School District*, Joseph Kennedy was an assistant football coach who encouraged his players to kneel and pray in the locker room (before a game) and on the fifty-yard line after each game.

Controversy ensued, and Kennedy received disciplinary action (it's a much longer story than I can fit here). A lawsuit followed that made it to the U.S. Supreme Court, where the Court did not use or even mention the once popular Lemon Test. Unfortunately, the court overruled *Lemon v. Kurtzman*, replacing it with a new test called "history and tradition," which Scott describes as "a particularly slipping criterium on which to base Establishment Clause jurisprudence across the board, but definitely in terms of creationism and evolution cases." Many legal scholars worry that the overruling may open the door to creationism snaking its way into our public school system.

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All the speakers I covered (and didn't cover) did an amazing job of informing, educating, and entertaining the CSICon audience. As with previous years, I came away with a deeper understanding and awareness of topics both in and outside of my usual area of interest. I'm already looking forward to next year's lineup. Never Stop Learning. ■

Kenny Biddle is a science enthusiast who investigates claims of paranormal experiences, equipment, photos, and video. He promotes science, critical thinking, and skepticism through his role as the Committee for Skeptical Inquiry's chief investigator.

The Third Time Was Filled with Charm

ADRIENNE HILL

Dave Farina. Image Credit: Adrienne Hill

CSICon 2023 was the third CSICon I have attended, and once again I enjoyed meeting new and old friends. As a retired educator, I was happy to see how much discussion there was about promoting scientific skepticism in the classroom and in the community via social media, libraries, and community centers.

Dave Farina: The Birth of a Science Communicator

Because I am a relatively new science communicator, I was looking forward to Dave Farina's talk. Known for his series *Professor Dave Explains* on YouTube, this full-time science communicator sets the science record straight on social media and as a classroom guest. His career on YouTube started when he took on flat-earth beliefs using simple scientific facts. His flat-earth rebuttals are still his most viewed videos.

Farina spoke about the Discovery Institute, which he called "creationism in a tuxedo." He said they often misquote actual literature. They say things such as "the government has never before forced vaccination," which ignores government mandates regarding smallpox and its eventual eradication. The Institute aims to erode the separation of church and state and promote intelligent design.

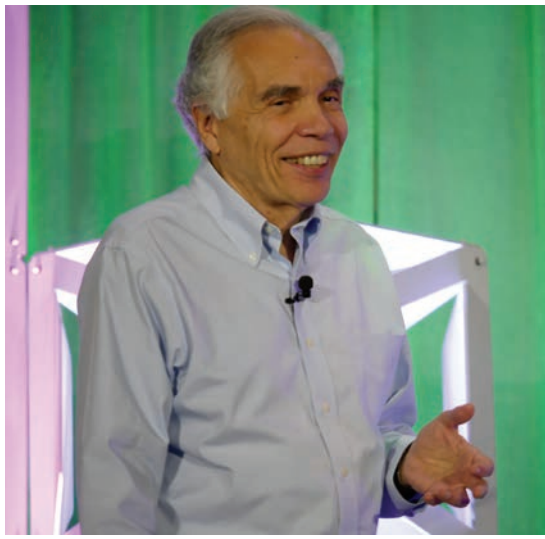
Farina is attempting to reclaim words co-opted inaccurately by the wellness industry, such as *natural*, *synthetic*, *organic*, and *theory* (I would add *chemical* to this list). Farina tackles the industry's fearmongering regarding chemicals and GMOs and their frightening photos of syringes piercing vegetables.

I wholeheartedly align with Farina's viewpoint when he emphasizes the importance of not disregarding any form of science denial even if it might appear trivial or foolish to some. Unfortunately, harm can always be found to some degree, and I agree that this "war" against science needs to be fought with an army of people on every social media platform, including, of course, Wikipedia.

Paul Offit: Why So Many COVID-19 Boosters?

I have been a fan of Dr. Paul Offit's work, including *Pandora's Lab* and *Bad Advice* (to name two of his many excellent books). Among other titles, Offit is the director of the Vaccine Education Center at the Children's Hospital of

Paul Offit and CFI's Cody Hashman in conversation.



Joe Schwarcz

Philadelphia. He had a front-row seat in the development of the COVID-19 vaccines as a member of the Food and Drug Administration (FDA) Vaccines and Related Biological Products Advisory Committee and a member of the Centers for Disease Control (CDC) Advisory Committee on Immunization Practices.

Offit explained how confusion around boosters started with President Joe Biden when he announced in August 2021 that a third dose of the COVID-19 vaccine would be available to everyone over twelve starting in September. Biden did not consult the CDC or FDA to make this announcement, causing two senior members of these organizations to quit. The FDA Vaccine Advisory Committee met that September and rejected the idea of a third booster. The CDC followed suit. Offit then detailed much of the confusion that followed and continued when the Omicron variant hit.

Loss of trust in the scientific community grew with the introduction of the bivalent vaccine. Initially, there was no human data for this vaccine. White House spokesman Dr. Ashish Jha declared on television that the bivalent vaccine was better when only mouse data was available. Offit says this is problematic because "Mice lie, and monkeys exaggerate"—a wonderful quote he attributes to David Weiner, a vaccine researcher from the University of Pennsylvania. As it turned out, the new vaccine didn't prove to be any better; the public health community was saying it was better when the science community was saying it wasn't. This made it difficult for Offit, who would appear on television and be honest about the results that the bivalent vaccine was not better. They weren't bad; they just weren't better. According to Offit, "You know you are not getting your message across when you get love letters from anti-vaccine activists."

The World Health Organization recommends targeted boosters each year for those in the high-risk groups rather than universal boosters. Offit referred to this as a nuanced recommendation. Should there be a nuanced recommendation? According to Anthony Fauci, when you have a nuanced recommendation instead of a universal recommendation, those in high-risk groups are less likely to get vaccinated. Offit, on the other hand, likes the idea of a nuanced message and looks forward to this being tested.

Joe Schwarcz: Quackery about Chemistry

Stepping up at the last minute to replace another presenter was fellow Canadian Joe Schwarcz, the director of McGill University's Office for Science and Society, which "has the mission of separating sense from nonsense." I was familiar with Schwarcz's work, mostly from being a regular reader of the excellent articles published weekly at https://www.mcgill.ca/oss/our-articles. At the start of his talk, we learned he hosts the longest-running chemistry radio show, *The Dr. Joe Show*—which is also the *only* chemistry radio show. We also learned that Schwarcz surrounds himself with ducks, which represent quackery and remind him to keep fighting.

Schwarcz regaled us with amusing tales about water. One was about a filter salesman whom he confused by drinking the "toxic" brown water the salesman produced from unfiltered water, then purchased the filters anyway, because he was in need of water filters. The salesman's trick is the same as that used by those pushing foot detoxifiers. To "detoxify" and cure a broad range of diseases, all you need to do is place your feet in a saltwater bath with electrodes. When the water turns a disgusting brown, it shows how many "toxins" are being released. But of course, even if you don't put your feet in the water, the water will still turn brown because the electrodes rust in the saline solution (see Ben Radford's piece "Kinoki Drains Wallet, Not Toxins" in the November/December 2011 issue).

Schwarcz described how the wellness industry capitalizes on desperation. Many people do not understand chemistry; they believe that chemicals (and chemists) are evil. To further illustrate this point, Schwarcz discussed and re-

futed a wide range of amusing claims. Pig genes have been inserted in soybeans and marketed as Piggysooy; rest assured that eating these will not turn us into pigs. Schwarcz emphasized that just because something is a chemical does not mean there is risk, and just because a substance has only trace amounts of a chemical does not mean it is safe. Effects are not dependent upon the compound being naturally or synthetically made. He finished with a few gem quotes: "There are no good or bad chemicals; there are only safe or dangerous ways to use them" and "Chemicals are not to be feared or worshiped; they are to be understood." Sage advice indeed.

Rina Raphael

Rina Raphael: Is Wellness More Promising or Problematic?

As an aging female, I'm very aware of the wellness industry because I'm often targeted on social media with wild claims of how I can keep my youth and stave off illness. Rina Raphael's talk was fun and inspirational. She is a journalist focusing on health, wellness, and women's issues. She used to promote a lot of the pseudoscience pervasive within the wellness industry until my fellow Albertan Timothy Caulfield constantly reached out to her, in a kind and dignified way, pointing out how she was in error and should not be promoting these harmful pseudoscientific wellness products and beliefs.

In her talk, she described the Wellness Club as being analogous to a Harley-Davidson Club, because how you dress, what you eat, and where you go is a way to earn respect. As you are walking down the street, somebody might say to you, "Love your leggings." They know you are in the same club as them because you wear yoga pants. According to her book *The Gospel of Wellness* (see a review in this issue), Raphael was obsessed with her health and fully believed in what the wellness industry was trying to promote, including clean eating, fitness trackers, supplements, cardio, and scream therapy. (Scream therapy, that's a new one for me! I used to practice that with my kids. I guess I was keeping healthy. Who knew?)

Raphael stated that the wellness industry targets women and often revolves around subjective values emphasizing psychology instead of science, portraying certain behaviors as essential for being a good parent or leading a healthy life. For example, serving organic food equals good parenting. Also, wellness is marketed as fashion, showing posed, stylish women in advertisements. In interviews, high-ranking figures in prominent wellness companies, such as Goop and Peloton, acknowledge that some of their claims may lack scientific backing, but they serve to instill a sense of control in their clients. This approach allows them to avoid the need for empirical evidence or to rely on experts. The confusion around what constitutes wellness—be it exercise, crystals, CBD oil, or even unconventional products such as CBD-infused toilet paper(!)—has led to a situation where almost everything is promoted as beneficial, diluting the meaningfulness of wellness practices.

Raphael attended every Goop summit, where she discovered that many attendees don't take Gwyneth Paltrow seriously. They say it's just fun and for entertainment. However, they don't seem to understand that what Goop promotes can have serious consequences for women's health. Raphael mentioned well-known Paltrow favorites: jade eggs and vaginal steaming.

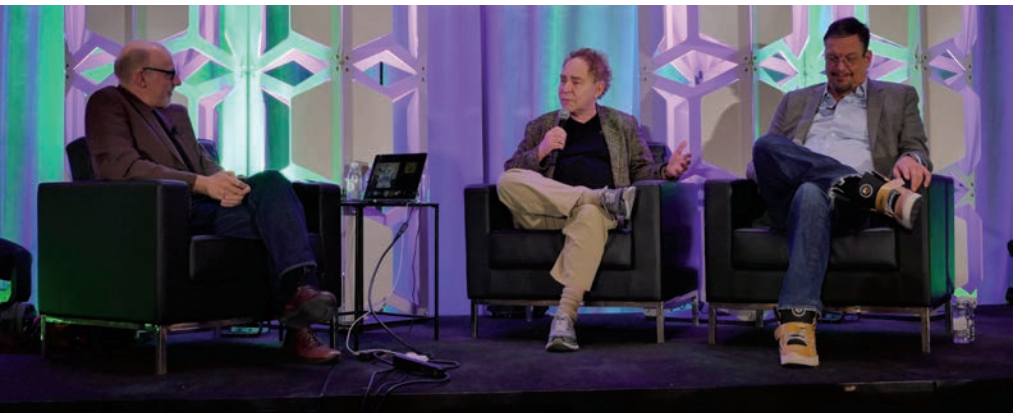
Raphael was optimistic, stating that due to the pandemic people are reassessing their health. They don't have as much disposable income, and so they are not willing to spend their money on products that don't work. Teens were finding wellness routines too time consuming and stressful and now just want to hang out with friends or listen to Taylor Swift. Gen Z is fighting back with comments such as, "If I want an Oreo, I won't drop dead from toxins. That's *your* generation!" Unfortunately, Raphael feels that the wellness industry is fighting back with a tactic that she dubs *science washing*, exemplified by Kim Kardashian pictured with beakers.

She finished her talk with the wonderful statement that she is no longer on Timothy Caulfield's "shit list." And George Hrab followed with a comment that the CBD-infused toilet paper is "direct marketing to assholes." ■

Adrienne Hill is a former high school mathematics teacher. She serves as a board member for the nonprofit organization About Time, founded by Susan Gerbic. Additionally, she holds positions as a board member, presenter, and educational consultant for the Tourette OCD Alberta Network. Hill actively contributes as an editor for Guerrilla Skepticism on Wikipedia, reports for *The Skeptic Zone* podcast, and cochairs the Western Canadian Reason Conference (WeCanReason), which is held in Calgary, Alberta, at the beginning of May each year.

The Lies We Share

PAUL FIDALGO



Left to right: Richard Wiseman, Teller, and Penn Jillette

Lies are pretty complicated, nuanced things. First, you have the lies that we get tricked into believing—the straightforward "out and out" kind of lies told by those who stand to benefit by convincing us of something they know is false. Canonical examples include Richard Nixon insisting that he knew nothing about the Watergate break-in or, apocryphally, the Greeks telling the Trojans that the giant wooden horse was just a gift to help patch things up. On the flip side, you have the kind of lie told by storytellers and entertainers, in which both the deliverer and the receiver of the lie are in cahoots. We might refer to this as "the willing suspension of disbelief," such that we can be roused by Alexander Hamilton delivering rapid-fire rap lyrics on a stage or be thrilled by a magic battle between wizards on a screen, despite knowing that none of these things have ever happened or could happen.

There's also a form of lie that sits somewhere in between, which is particularly pernicious and remarkably resilient: when a lie is believed regardless of whether its teller knows it is false or is indifferent to its veracity. Like the overt lie, it is knowingly fabricated for the teller's benefit, but much of the burden of persuasion is voluntarily taken on by the audience. Like the willing suspension of disbelief, its acceptance can be inconsistent, hinging on its usefulness: an election was rigged and corrupt, unless our side won, in which case it was free and fair. God is all-powerful and all-good, until there is a massacre at a school or a natural disaster that kills thousands, at which point God's ways are mysterious.

For CSICon 2023 in Las Vegas, I was assigned to cover the afternoon and evening events of Saturday, October 28, the second full day of presentations. This portion of the conference featured what seemed to be rather disparate speakers and topics: two talks from serious authors engaged in deep research dealing with the calculated spread of falsehoods about existential matters, and two talks featuring entertainers—one a comedian, the other a pair of magicians. Despite their very non-overlapping magisteria, however, taken together they gave me a lot to think about concerning how people handle untruths.

Richard Wiseman Interview with Penn & Teller

The afternoon's marquee event, an unscripted conversation with Penn & Teller (moderated by psychologist and magician Richard Wiseman), included the magic duo discussing how their love of stage magic was born of a fascination with how people, as Penn put it, "decide what reality is," which he said is "always a shared decision." Teller recalled how magic instilled drive to understand how reality "could look one way and be another," and, following the example of the late James Randi, they approach audiences "with the knowledge that you know stuff," the shared decision, as Penn put it, to believe the unbelievable.

In fact, Penn explained that magic held no interest for him at first. "Magicians and scientists had ganged up in order to embarrass me in front of my parents and steal money from my parents," he said (see the Fun & Games section in this issue of SI for more about the test kit that ruined Penn's faith in magicians). But it was Teller who helped him see that "magic could be done honestly, and it could be done with respect" for the audience.

Naomi Oreskes: How Market Fundamentalism Led to Anti-Science

Contrast the Penn & Teller attitude toward the distortion of reality with that of individuals and institutions that peddle falsehoods for their own selfish gain. Earlier that day, scientist and historian Naomi Oreskes discussed the ways entire industries can construct an alternate universe, complete with its own claims about the nature of reality, not unlike religions. With climate change as an example, Oreskes showed how the fossil fuel industry mounted a massive campaign to sow doubt on the science behind it and thwart any political action that would impact their bottom line. The roots of that doubt were planted well before climate change became a salient political issue, with the cultivation

Naomi Oreskes

Glenn Kessler

Leighann Lord

of what she called "market fundamentalism," an ideology that asserts political freedom is indivisible from economic freedom (or, more accurately, deregulation), which was also fused with religious freedom (or, more accurately, Christian privilege).

An entire culture of academics and experts were financed by big business and its representatives to legitimize demonstrably false claims, both economic, such as the claim that regulation undermines political freedom and democracy (it doesn't) and scientific, such as claims that there was no hole in the ozone or that trees cause pollution. And as much as market fundamentalism was its own form of religion, its proponents also wield religion as a weapon to further degrade trust in science, and thus we see free-market politicians and organizations also pushing to have creationism taught in public schools.

Glenn Kessler: Fact Checking in a World of Misinformation

That same day, the CSICon crowd heard from Glenn Kessler, a pioneer in lie-busting as chief writer (and assigner of Pinocchios) for the "The Fact Checker" at the *Washington Post* since 2011. Political figures have become more brazen in their lies in recent years, according to Kessler, and lies are becoming trickier to pin down. (Advising us to "always follow the footnotes," Kessler compared his research process to a game of "academic telephone tag.")

Of course, politicians wouldn't have become so bold with their lies if there wasn't a market for them, and this is where the kind of falsehoods that Kessler combats begin to overlap with the willing suspension of disbelief shared by entertainers and their audiences, as a growing swath of the voting public seems rather disinterested in whether what they're told is true. What's instead important is *who is telling it*. Kessler cited survey data showing that only 49 percent of Republican voters believe that honesty is an important quality for a presidential candidate. He also mentioned studies that showed how respondents' ability to comprehend basic math is affected when questions have some kind of partisan valence (for example, liberals would tend to misconstrue an article about the efficacy of gun laws if it contradicted their preexisting beliefs). In other words, people are prioritizing narratives that support their particular tribe, regardless of whether those narratives are true. And this is one of the primary reasons that, despite the proliferation of fact-checking organizations (Kessler said they ballooned from three when he was getting started to about 300 today), easy access to the truth does not necessarily sway anyone away from their cherished lies. As Kessler ominously noted, "A torrent of facts didn't stop January 6."

That's the thing about this in-between zone of lying, when the person being lied to is almost inviting it and doing all the cognitive work to make it jibe with their preferred version of reality. Once a person has attached themselves to a lie, such as the claim that the 2020 election was stolen, their sense of self is now bound to it. It's not unlike seeing an amazing magic trick by Penn & Teller and then immediately being told how it was done. Some of us may find such explanations just as riveting and awesome as the trick itself, but for others it spoils the entire experience. And having the illusion of a magic trick spoiled is one thing; having one's illusions about the workings of the entire world shattered is quite another. The stakes are impossibly high for everyone on all sides of the reality divide.

Leighann Lord: If We Can Laugh Together, We Can Live Together

Amid all these rather weighty presentations, the CSICon audience was treated to a half-hour of wit and wisdom from comedian Leighann Lord. She's already a beloved figure in our little universe as one of the hosts of the *Skeptical Inquirer Presents* web series and the podcast *Point of Inquiry*, as well as a master of ceremonies at numerous skeptics' events, so seeing her perform is a lot like seeing a wonderful old friend who never fails to make you laugh. Of course, she had her zingers about religion ("I'm not religious; I can't be—I have a vagina") and other topics, but her comedy is anything but divisive. At a time when so many of us simply don't know what to believe or whom to trust, Lord has a way of allowing us to laugh at ourselves as much as anything else. And as she noted in her closing, "My hope is that if we can laugh together, we can live together." I hope so too. ■

Paul Fidalgo is editor of *Free Inquiry* and executive director of the Council for Secular Humanism.

Come for the Speakers, Return for the Community

SUSAN GERBIC

Come for the speakers, return for the community—that has been my experience in the seven CSICons I've attended. To be honest, I'm normally not one to regularly attend the talks. I know, I know … but this year I was asked to review Dustin Dean's talk (and I didn't want to miss the proceeding talks by Stuart Vyse, Dave Farina, and Stephen Hupp). I found that I really enjoyed sitting in the main room, photographing the audience, and listening to the many excellent talks. I managed to attend all but a few, and there wasn't a bad one in the mix. I learned something from everyone and enjoyed myself immensely.

Dustin Dean

Dustin Dean: The Modern Age of Psychics and Social Media

James Randi, Jerry Andrus, Ray Hyman, Penn & Teller, Banachek, Mark Edward, Richard Wiseman, and now a new face has joined the fight against the nonsense: CSICon welcomes mentalist Dustin Dean to the community. There has been a long history of magicians—going back to Houdini—interested in unmasking psychic mediums. I was familiar with Dean's work prior to watching his talk from his short clips on TikTok calling out people who claim to have magic powers, so I was excited to see him in person.

TikTok, which some say is the fastest growing social media network, can be intimidating with its quirky style. Many videos have large colorful text splashed on closeup portrait videos with everything moving fast to grab the viewers' attention. Dean seems to have satisfied the algorithm gods and grown his channel to a half million followers and almost fourteen million likes. His style is flippant, funny, and aggressive—just what the TikTok audience loves.

His channel focuses not only on his mentalism but on exposing psychics and challenging people to prove their claimed paranormal powers with a $10,000 monetary prize. In his talk at CSICon, he introduced himself by sharing his background. Raised in a Christian household that saw magic as something from the devil, Dean rebelled and learned magic, deciding to specialize in mentalism or, as he describes it, "sleight of mind." The world of mentalism and psychics are intertwined; each appears to have extrasensory powers. Mentalists naturally have a disclaimer about their "powers," whereas psychics try to fool us into believing they truly have paranormal powers.

Dean's message to the CSICon audience was that more people need to get into the fight. Find something you can do and "fight fire with fire." Dean started the hashtag #DebunkTok in 2020, which has gone viral with just under 100 million views so far. The idea is to find people who claim to have paranormal abilities and then expose the trick with a follow-up video. His message to viewers is to not believe everything you see on TikTok; be critical and stay skeptical.

The Guerrilla Skepticism on Wikipedia (GSoW) Table

Why in past years would I have avoided the talks? Because I can be found in the book room where I'm set up to recruit attendees to join the Guerrilla Skepticism on Wikipedia (GSoW) project or whatever other project I have my fingers in at the moment. I want to be on hand

to answer questions, and to do so I need to be at my table. Other GSoW editors are of course in attendance, but I want to make sure they don't feel obligated to helm the table. So usually I remain. Don't pity me; more happens at that table than you realize! For example, the speakers often venture over, and I can have a quiet talk about their Wikipedia pages, editing them as we chat. We catch up, and sometimes plan future projects together. When there are breaks from the talks, my table is surrounded, and I love it.

This year, we had the added bonus of aluminum hats. CFI Director of Libraries Tim Binga gave me two rolls of foil and left me to it. I didn't have a clue, but Greg Roe from the Santa Cruz Skeptic Society watched a few videos and started folding. People were at first reluctant to block the rays, choosing to expose their brains to whatever happened to be shooting around the room. But after a day, a few brave attendees like me didn't care if they looked silly, and it started to trickle out into the audience and very quickly became one of the top selfies when someone came across another silver-hatted person. I wore mine outside the conference hours, which led to some interesting conversations with the "regular" people. I was the last to slip into a crowded elevator on one evening and realized that one man was looking at the CSICon nametag, then at my hat, then back to my nametag trying not to be obvious. I looked up and said, "It's my hair, right?" and the whole elevator started cracking up. I only had a couple floors to explain that I'm attending a critical thinking science conference and that the hat is just for fun. They seemed relieved.

SI contributor Daniel A. Reed and Susan Gerbic

The Conference Community

Shane Smith from the Utah Beehive Skeptics told me after the conference that he was really surprised that the speakers were so friendly and approachable. He had been to many work-related conferences in the past, but this was his first CSICon. He was shocked to see Bill Nye wandering the hallways, attending the talks, and getting coffee during breaks. He seemed to think that Nye would be helicoptered in for his talk and then whisked off again to meet with the president or something. Not only did Nye attend the talks, but he sat in the second row and even asked questions of the speakers. The same went for Richard Dawkins. He, too, was paying attention and was as interested as everyone else with no pretention at all, just one of the community.

And that is the thing: we are a community. Sometimes we are criticized for preaching to the choir, and possibly sometimes we do. But I'm a part of that choir, and I badly need some preaching to keep me motivated and help me see the bigger picture. The work we do can be frustrating—one step forward and two steps backward—and the world around us gives us no attention at all; many look for chances to take nasty swipes at our motives. I need my embers to get a new spark from time to time, and I think this is the same for all the other attendees, including the speakers.

Daniel Reed (West Virginia Skeptic Society), Shane Smith and Carolyn Dougherty (both from Rational Roundtable–Stockton/Lodi Calif), and Eric Shaver (CFI's outreach coordinator) discussed their favorite parts of CSICon with me. Besides being surprised at how welcoming people were, they were also surprised at how funny the talks were. Humor was explicit throughout most of the talks—not only in comedian Leighann Lord's set (naturally, she was hilarious). They expected a stuffy science convention but instead discovered that the conference was a wonderful experience. That seemed to be their biggest takeaway.

This was my first full year as the CFI Ambassador, but social butterfly might better explain my role. The pandemic has done a number on our local groups, and any group that was struggling pre-COVID-19 mostly did not survive. We can't wait for governments to legislate our way out of all the world's problems. We have to rely on each other to grow our community and our impact. To do this we have to find, mentor, inspire, train, and motivate the people who will be the future speakers, doers, organizers, and writers that will fight back against the challenges we face. Attending conferences such as CSICon is a must. Come for the speakers, return for the community. ■

Susan Gerbic is the cofounder of Monterey County Skeptics and a self-proclaimed skeptical junkie. She is also founder of the Guerrilla Skepticism on Wikipedia (GSoW) project and a fellow of the Committee for Skeptical Inquiry.

Why Weird Stuff Matters: Chris French on *The Science of Weird Shit*

STEPHEN HUPP

Chris French, professor emeritus of psychology at Goldsmiths College, is a leading authority on, well, weird shit. His previous books on anomalistic psychology were written for an academic audience, and now he has a new book for the masses titled *The Science of Weird Shit: Why Our Minds Conjure the Paranormal*. I've been influenced and inspired by French for a long time, so I was delighted to learn of this new book. I jumped at the chance to ask him a few questions.

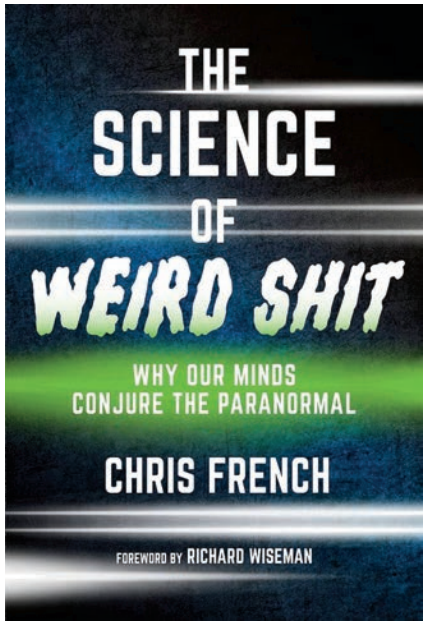
SH: Before you found skepticism, what fascinated you the most about the paranormal?

CF: Looking back, I think there were a lot of factors. As a child, I was terrified by the idea of ghosts. I am not sure whether I in fact believed in ghosts or not, but the *idea* that they might be real was enough for me to need a night light for a lot longer than most kids!

When I was a teenager, Uri Geller appeared on the scene in the U.K., and his claims were endorsed by some eminent scientists at the time. To me, with my love of science fiction and fantasy, the notion that some people might really possess superpowers was incredibly exciting.

In your book, you describe the precise moment you turned toward a skeptical worldview. Can you share that experience here too?

I did my PhD at the University of Leicester. While I was there, a friend recommended a book that they thought I might like. That book was James Alcock's *Parapsychology: Science or Magic?* (1981). It was the first ever skeptical analysis of paranormal claims I had ever come across, and, as my friend expected, I really did enjoy it. The book opened my eyes to the fact that there were skeptical publications out there if you knew where to look. Up to that point, I had never heard of Skeptical Inquirer, but I immediately took out a subscription and read every issue I could get my hands on from cover to cover. I also bought books by the likes of James Randi, Ray Hyman, Martin Gardner, and others. From that point on, I was hooked.



You've also shifted your thinking away from dogmatic skepticism toward being more open-minded. What influenced this change?

When I first discovered the joys of skepticism, I held a lot of dogmatic views, such as that all self-proclaimed psychics were either crazy or con artists, that all parapsychologists were incompetent, and that all evidence put forward in support of paranormal claims could be easily explained away by skeptics. I no longer hold any of those views. The main reason for moving away from a position of dogmatic skepticism and back toward a more central position—although still definitely a skeptical one—was simply interacting with psychics and, even more so, with parapsychologists. There is absolutely no doubt that some self-proclaimed psychics are indeed deliberate con artists, but, in my opinion, most of them genuinely believe they have psychic abilities. Similarly, some parapsychologists carry out very poor research (as do some psychologists!), but most, such as Caroline Watt and the late Bob Morris, have as sound an understanding of the scientific method and statistical analysis as other scientists.

You founded the Anomalistic Psychology Research Unit (APRU) at Goldsmiths. What are some of the best achievements to emerge from this unit?

When I founded the APRU back in 2000, I was very aware that many people did not see anomalistic psychology as being "academically respectable." Such people would say things such as, "We all know that [insert your chosen paranormal phenomenon] isn't real, so why are you interested in it?" I always felt that such views did not reflect a truly open-minded, scientific attitude. None of us can know for certain that all paranormal claims can be explained away in non-paranormal terms. More importantly, for me as a psychologist, the fact that

so many people do believe in the paranormal and a sizeable minority claim to have directly experienced it was something that required explanation. One of our major goals then was to raise the academic profile of anomalistic psychology by, for example, publishing our research mainly in mainstream psychology journals rather than parapsychology journals. I like to think that we have had some success in raising the profile of anomalistic psychology and making it a bit more "academically respectable."

Also, I believe that anomalistic psychology is an excellent vehicle for promoting critical thinking skills. Given that most people, whether believers or skeptics, find topics such as alien abduction claims, the possibility of life after death, and the existence of psychic powers fascinating, critical discussion of such topics provides a great way to explain why some types of evidence, such as that coming from well-controlled experimental studies, is worth more than other kinds, such as anecdotal evidence. Given the media's love of all things paranormal, members of the APRU have often been able to promote critical thinking on numerous TV and radio shows, on podcasts, and in newspapers and magazines, not to mention at science communication events.

You've embraced the term *anomalistic psychology* while acknowledging that it is not widely known. Do you still embrace that term? What do you think of the term *parapsychology*?

I embraced the term *anomalistic psychology* because I wanted a concise phrase to allow me to tell people what my primary research area was rather than coming out with the rather verbose, "It's the psychology of paranormal and related beliefs and ostensibly paranormal experiences." My attempt was only partially successful, however, as the usual response I got when I told people that my research area was anomalistic psychology was, "What the heck is that?" Now that the term *anomalistic psychology* is slowly becoming a bit more widely known, things are improving so I will be sticking with it.

Although we all think we know what terms such as *parapsychology* and even *paranormal* mean, it is in fact incredibly difficult to come up with a definition that everyone finds acceptable, as I discuss at length in my forthcoming book. I think the important thing is for everyone to be as clear as possible as to what they mean by such terms when they use them in particular contexts. For example, most parapsychologists adopt a fairly strict definition of the paranormal as referring to evidence relating to the three core concepts of extrasensory perception, psychokinesis, and life after death. The media and anomalistic psychologists often adopt a much looser definition that encompasses such phenomena as alien abduction, astrology, the Bermuda Triangle, cryptids, and so on. I think this is justifiable on the grounds that similar psychological processes seem to play a role in phenomena that would be included in the strict definition (e.g., mediumship) and the wider definition (e.g., astrology).

Chris French. Credit: profchrisfrench.com

I was delighted to read that, thanks to Alcock's book, you became an early and enthusiastic subscriber of Skeptical Inquirer. What about the magazine most appealed to you?

If I'm honest, I must admit to getting a certain thrill from learning the true explanation for superficially mysterious phenomena, and the Skeptical Inquirer is always packed with such revelations related to a wide range of paranormal claims. Over the years, the remit of the magazine and of the skeptical movement more generally has widened to include many other controversial issues, and I certainly welcome that. My main interest and area of expertise, however, continues to be the paranormal and closely related topics, and SI is still my favorite source of information on those topics.

You were the editor of *The Skeptic* magazine (in the U.K.) for about a decade, calling it "a blessing and a burden." What did you like best (and least) about being the editor?

Editing *The Skeptic* helped me to raise the profile of the APRU, and I'm sure it also led to more media inquiries coming our way. Having a constant stream of interesting articles submitted meant there was rarely a dull moment. But what I liked the most about being the editor was the opportunity it gave me to make contact with, and often befriend, a wide range of interesting and intelligent people. I am still thrilled by the fact that I now consider Jim Alcock, the man whose book got me into this stuff in the first place, a personal friend. I also got to be on hugging terms with James Randi,

the patron saint of skeptics (if we were allowed to have patron saints—which of course we're not).

The thing I hated the most about being the editor was simply struggling to find time to get each issue out while holding down a fulltime academic job as well as having domestic responsibilities. No one involved in the production of the U.K. magazine was paid for their contribution. It was all a labor of love. After a decade of being at the helm, I decided it was time to pass the role on to Deborah Hyde, who did a fantastic job for the next decade. Eventually, she too decided to step down, and Michael Marshall of the Good Thinking Society took over. It's good to know that the magazine is still in safe hands. It is currently available for free, online only, at https://www.skeptic.org.uk/.

In *The Skeptic*, you recently wrote an excellent article titled "Why I Now Believe Parapsychology Is a Science Not a Pseudoscience." Why do you believe this?

For a long time after I first self-identified as a skeptic, I went along with the opinion of most skeptics that parapsychology is nothing more than a pseudoscience. I even used to express this view very strongly to students in my "Psychology, Parapsychology, and Pseudoscience" course. However, I gradually concluded that many of the criticisms that skeptics level against parapsychology in terms of its scientific status were simply not true. I was influenced in this by a 2003 paper by Marie-Catherine Mousseau titled "Parapsychology: Science or Pseudoscience?" in the *Journal of Scientific Exploration*. Taking an empirical approach to this issue, she had compared the papers in three mainstream journals and three "fringe science" journals in terms of the degree to which they met various criteria commonly said to characterize pseudoscience (such as an emphasis on confirmation rather than refutation, an absence of self-correction, a lack of connections with other fields of research, and so on). Her empirical approach showed that parapsychology typically fared well in comparison to mainstream science.

Furthermore, it seems to me it would be ridiculous to deny that when skeptics (such as James Randi, Susan Blackmore, Richard Wiseman, and me) test psychic claimants under well-controlled experimental conditions, we are engaged in parapsychological investigations. So, I ended up concluding that parapsychology, at its best, can reasonably be described as a true science—even if I would still bet that paranormal forces do not exist. After all, science is first and foremost a method for trying to ascertain the way the world works not an unchanging body of established "facts."

You originally planned to title your new book *Why Weird Stuff Matters*. One would have to read the whole book to get the complete answer to this question, but can you give us the elevator pitch? Why does weird stuff matter?

There are many reasons weird stuff should be given more serious consideration than it usually receives. First, although I personally believe that genuinely paranormal phenomena do not exist, I may be wrong. For me, an important part of proper skepticism is to always be open to the possibility that one may be wrong. If convincing evidence comes along in the future that proves that at least some ostensibly paranormal phenomena really are beyond explanation in terms of conventional scientific concepts, that would be a tremendous breakthrough—but I'm not holding my breath.

Second, if the wider scientific community is correct in adopting a generally skeptical attitude toward paranormal claims, we can surely learn a lot about the limitations of the scientific method—at least as practiced by imperfect human beings—by giving serious consideration to the apparently significant positive results produced by parapsychologists as already discussed.

Third, there is an important theme of consumer protection that runs through anomalistic psychology. People have a right to know if there is good evidence to support the claims made by psychics, mediums, and alternative medicine practitioners before they spend their money on the services offered. In general, of course, there isn't.

Most important, for me as a psychologist, we would be ignoring an important part of human experience if we make no attempt to understand "the weird stuff." We can learn important lessons about the human mind by taking such experiences and beliefs seriously. (I hope that elevator was in quite a tall building!) ■

Note

Space prevented us from printing the entire interview. On our website (skepticalinquirer.org), Chris French answers additional questions, so be sure to check it out!

Stephen Hupp is the editor of Skeptical Inquirer.

Read the whole interview here:

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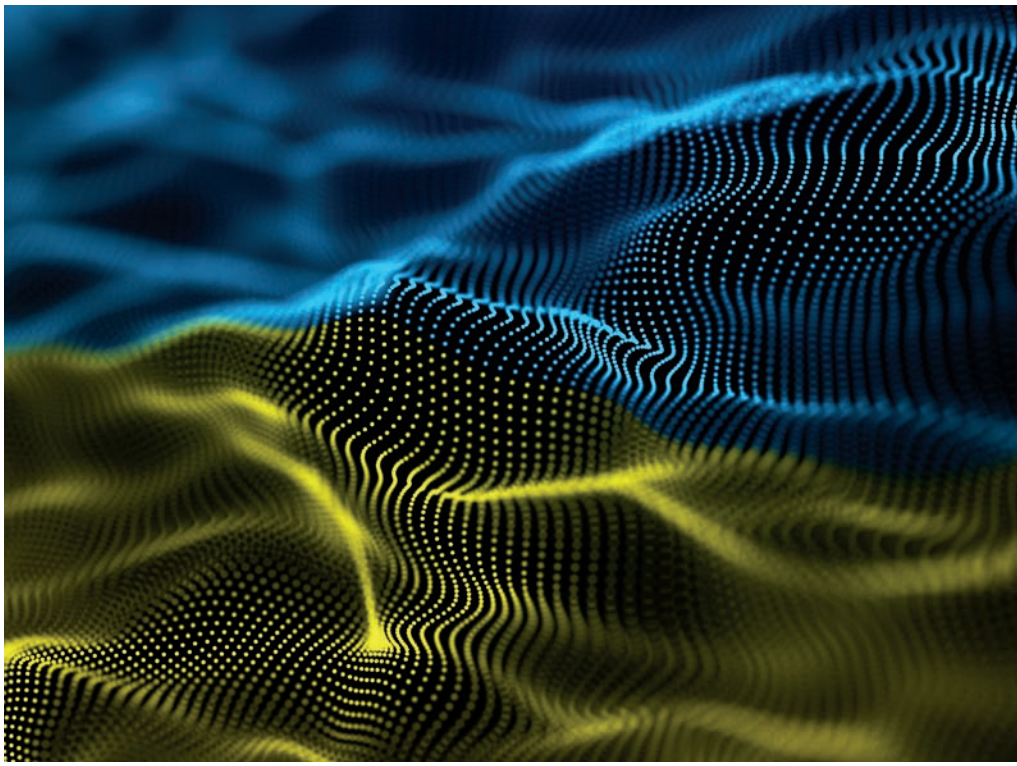
Threats to Science in Ukraine

ANASTASIIA LUTSENKO



Against the backdrop of the ongoing conflict in Ukraine, the scientific community grapples with unprecedented challenges. Many researchers face displacement and resource constraints. Yet amid adversity, there is an opportunity for Ukraine to transform its scientific infrastructure, potentially positioning itself as a key player in technological innovation. Recognizing the historical echoes of intellectual exodus underscores the delicate balance between scientific pursuit and survival. As Ukraine navigates these complexities, the restoration and preservation of its scientific foundation emerge as crucial components for national recovery and future prominence on the European technological stage.

With the onset of the current phase of the Russo-Ukrainian war, numerous accounts highlight the challenges faced by scientists who have had to relocate, often saving not only their families but also valuable specimens and scientific collections. Stories abound, such as Olga Malyuta's evacuation of a sperm bank and Marina Shkvirya's efforts to evacuate bears, rescued from circuses and illegal private zoos, to Western Ukraine and Germany. The war unquestionably poses a significant threat to natural ecosystems, inflicting extensive losses directly through combat actions and indirectly by severely disrupting existing ecosystems. This disruption leads to irreparable losses among endangered animal species. Making matters worse, many of Ukraine's universities can only operate virtually (Suchikova and Tsybuliak 2023).

Concurrently, scientists who chose to remain in Ukraine are navigating complex conditions characterized by online work, blackouts, power outages, and the inability to conduct experiments under normal circumstances. Ornithologists, for instance, find their fields and forests littered with land mines, while those who study the Black Sea face impediments to quality monitoring. These accounts underscore the resilience and dedication of scientists working under adverse conditions, emphasizing the need for comprehensive support and strategic initiatives to sustain and revitalize scientific endeavors in Ukraine.

Scientists currently working outside the country express a desire to return to Ukraine; however, the attractiveness of their home country as a research environment plays a pivotal role in this decision. Infrastructure and funding for scientific endeavors abroad are notable, posing a challenge for Ukraine to retain expertise. Oksana Piven, a Ukrainian molecular biologist, discussed these concerns in a recent interview, emphasizing the critical need for the Ukrainian scientific community to address these challenges and create an environment conducive to research and innovation (Piven 2023).

However, within every crisis there is opportunity; in this case, there is potential for Ukraine to transform its devastated infrastructure through investment and the groundbreaking exchange of expertise among scientists. This presents an advantage not only for Ukraine but also for other countries that stand to gain expertise from Ukrainian scientists who, due to the war, possess unique insights into scientific crisis management.

Historically, the full scope of events

and their implications often become clear only as time progresses. For instance, various regimes have exhibited a pattern of suppressing scientific discovery and discourse whenever it contradicted the state's ideology or posed a threat to its control. This reality underscores the precarious position of science amid political and military adversity. Likewise, during the German Reich many intellectuals and scientists either fled the country or were persecuted, which had a profound impact on the scientific community. This exodus, often referred to as a *brain drain*, saw eminent figures such as Albert Einstein relocating to safer environments abroad. Such historical episodes shed light on the enduring tension between authoritative control and the free pursuit of scientific inquiry, often shaping the course of intellectual advancement.

What can break this recurring threat to science? Paying attention to its struggles, preserving science during the war, and helping it in its recovery might be some of the answers. The threat to science in Ukraine provides timely examples we can examine with an eye toward the future.

Our research (Lutsenko et al. 2023) indicates that the conflict in Ukraine has resulted in about 40 percent of Ukrainian researchers becoming internally displaced, with an additional 15 percent leaving the country to find safety—culminating in over 50 percent total displacement. This also means that approximately half remain in Ukraine, permanently risking their lives, probably due to having few options. Further, about 40 percent of the scientists have financial resources sufficient only for food. Another 28 percent noted that while they can afford food and clothing, purchasing items for long-term use is challenging. Overall, 84 percent of respondents acknowledged a decline in their financial situation compared to the pre-war period. Among those involved in government or nationally funded projects, 29 percent reported suspensions or issues with project execution due to the war. A substantial 73 percent of scientists admitted to being hindered in maintaining their pre-war levels of research engagement. The primary obstacles identified include: 1) perceptions of danger; 2) inability to attend the workplace, particularly when the nature of work demands it; 3) difficulties accessing the internet, mobile networks, and electricity; and 4) a general lack of interest or feelings of apathy. This all stifles scientific advancement.

Fortunately, international support can help scientific advancement. Recent research within the Science at Risk Project (scienceatrisk.org), sponsored by the Alfred P. Sloan Foundation, along with the research conducted within the #Science4Ukraine initiative shows that massive international support and networks helped the Ukrainian science system remain functioning over these difficult times. Only time can fully tell its true impact on science.

Once the Ukrainian scientific community is appropriately protected, it can give us many more discoveries and have a valuable impact on our own lives. Many Nobel Laureates have either embarked on their scientific explorations or spent part of their careers within what now constitutes Ukrainian territory, including Simon Smith Kuznets (Economic Sciences, 1971), Igor Tamm (Physics, 1958), and Lev Landau (Physics, 1962). Furthermore, several Nobel Prize recipients born outside of Ukraine have their ancestral roots traced back to this culturally and ethnically diverse land, among them César Milstein (Physiology or Medicine, 1984), Eric Kandel (Physiology or Medicine, 2000), Ralph M. Steinman (Physiology or Medicine, 2011), Herbert Charles Brown (Chemistry, 1979), Dan Shechtman (Chemistry, 2011), Murray Gell-Mann (Physics, 1969), David Jonathan Gross (Physics, 2004), Serge Haroche (Physics, 2012), and Boris Pasternak (Literature, 1958).

The true effects of world events often become clear only over time. Many scientists are caught in a dilemma of either pursuing research or battling for their survival, and some may no longer have a choice in the matter, such as the members of the Austrian School of Economics who tragically fell victim to devastating historical events. Its prominent members fled Europe due to the rise of totalitarian regimes, and some migrated to the United States and other countries. This exodus led to a decline in the influence and cohesion of the Austrian School in its place of origin. For example, key figures such as Ludwig von Mises and Friedrich Hayek left Europe and continued their work elsewhere. And only now, after decades, do we realize the devastating nature of this historic process after which this school is often referred to as the one "that never recovered to the pre-shock level" in its place of origin. Is this the price we want to pay?

Returning to the case of Ukrainian science, it has the potential for restoration and preservation, representing perhaps the sole avenue that merits belief and concerted effort from all stakeholders. The pivotal nature of this prospect lies in the realization that without a robust scientific foundation post-victory, Ukraine faces the peril of transforming into a semi-devastated wasteland. Conversely, with strategic support and high-quality reconstruction, Ukraine has the potential to emerge as a technological hub for Europe. Embracing this trajectory demands collective belief and dedicated work, as the resilience of Ukrainian science becomes a cornerstone for national recovery and future prominence on the European technological stage. ■

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[POSTCARDS FROM REALITY

ROBYN E. BLUMNER

Robyn E. Blumner is president and CEO of the Center for Inquiry and executive director of the Richard Dawkins Foundation for Reason & Science. She is a lawyer who previously held posts as a syndicated columnist and editorial writer at the *Tampa Bay Times* and as executive director of the ACLU of Florida and ACLU of Utah.

Defending Science against Social Justice Dogmatism and Identitarianism

Developing countries such as Bangladesh, India, the Philippines, and other nations where rice is a principal staple of poor children's diets suffer from a particular type of malnutrition. A diet largely consisting of a few bowls of rice per day will result in a vitamin A deficiency. This exceptionally dangerous condition is responsible for a million deaths annually—mostly of children—and another half million cases of blindness—again, mostly in kids (Regis 2019).

To the rescue came a scientific breakthrough called golden rice, a genetically modified organism (GMO). This rice, first created more than twenty years ago, is biofortified to produce beta carotene that converts to vitamin A after digestion. Rice plants naturally have beta carotene in other parts of the plant—the stems and leaves—but none in their rice grains. Modifying the plant to produce beta carotene in the grains prevents incredible human suffering and misery.

Sadly, as many of you reading this already know, golden rice, which was to be distributed for free with no profit motive from the researchers, was stymied by anti-GMO "Frankenfood" hysteria. The alleged do-good community—including, famously, Greenpeace—encouraged regulatory hurdles by governments that very nearly strangled golden rice in its crib. Finally, in 2022, large scale golden rice cultivation occurred in the Philippines with the crop distributed to the country's at-risk population. Finally!

Most of the objections made against golden rice had to do with safety and efficacy. Although overblown in this case, in general these are legitimate concerns. But there was one particularly galling and noxious objection that had nothing to do with whether golden rice lived up to its billing: the idea that GMOs are inherently racist and colonialist because they are the product of "Western science."

A piece in *Scientific American* magazine about biotech crops stated bluntly: "At its base, GM [genetically modified] crops are rooted in a colonial-capitalist model of agriculture based on theft of Indigenous land and on exploiting farmers' and food workers' labor, women's bodies, Indigenous knowledge and the web of life itself" (Aga and de Wit 2021). Frankly, I don't think the child who can see thanks to golden rice really cares where GM crops are "rooted."

Similarly, in a piece titled "Decolonizing the GMO Debate" in *The Counter*, engineering studies professor Benjamin Cohen of Lafayette College wrote, "The GMO proponents' technocratic version of reform is colonial in its reliance upon and perpetuation of the logic of conquest. It puts nature in the position of an 'Other,' a separate sphere to be fixed or improved not just by humans but by Western, market-oriented humans" (Cohen 2021). Are we really going to interrogate the source of every scientific advance and reject those derived from anyone with too little melanin, too much testosterone, too much first-world education, and too much private funding? That's definitely not a world I'd want to inhabit. But increasingly dogmatic social justice/identitarian considerations are leaching into science in a way that is hampering progress in the field.

Perhaps the worst example is happening in New Zealand, where the government decided that public school students in science classes should be taught that Mātauranga Māori, or the Maori "ways of knowing," are equivalent to Western science (Coyne 2023). These indigenous traditions and beliefs are steeped in mythology, god-beliefs, and superstition. It's as if the United States started requiring that creationism be taught alongside the theory of evolution as equivalent explanations for life's diversity. The approach will only further hamper science literacy in that country, which is already experiencing significant losses in standing relative to other developed nations.

Identitarianism, a term once reserved for far-right ideology, is now charging into STEM publishing from the far left in a way certain to obscure scientific merit by making it seem as though one's background and demographics unduly influence scientific outcomes. These "positionality statements" are now being encouraged by some science journals (Zamzow 2023). So rather than simply report on their data and findings, authors of papers submitted for publication are being urged to list their race, ethnicity, gender, sexual orientation, and disabilities or advantages.

Science is society's best means of advancing human progress precisely because it focuses on demonstrable achievements and evidence-based results, instead of on who did the research or where they came from. Giving up this essential neutrality principle or suggesting that science is inevitably differentiated based on the researcher's background is corrosive to the entire enterprise.

Besides, I don't know how much

more disadvantaged, excluded, or bullied you could be in the cruel hierarchy that is the American high school than being a total science nerd—the lowliest rung. One's victimhood points should overfloweth.

There's a similar social justice warrior project called "citation justice" that tells scholars to bulk up their research papers with citations by people of color, women, indigenous people, etc. This will serve to boost the careers of those cited. Once again, identity is deemed a value higher than pure merit—the proper yardstick for when a citation is warranted.

Some courageous scientists are starting to push back on all this, rightly worried that merit is suffering under all this identitarian baggage. In November 2023, thirty-nine scientists issued a paper and a clarion call saying that there is a censorship crisis in science being motivated by science journals and organizations seeking to prevent harms to social justice—and undermining academic freedom in the process (Alonso 2023). Publication of legitimate and potentially important research is being suppressed in the name of not harming the dignity of certain groups. Hundreds of scholars have been punished for controversial statements and findings, the scientists report.

In April 2023, the *Journal of Controversial Ideas* published a paper signed by twenty-nine scholars titled "In Defense of Merit in Science" (Abbot et al. 2023). *New York Times* columnist Pamela Paul (2023) covered the fact that the paper had been rejected by mainstream science journals. Apparently standing up for merit in science is a radioactive idea.

The paper's authors document how "ideological concerns are threatening independence and rigor in science, technology, engineering, mathematics and medicine," Paul writes. She paraphrases the authors' basic thesis: that while "expanding opportunity for more diverse researchers in the sciences is laudable," pursuing it should not be "at the expense of foundational scientific concepts like objective truth, merit and evidence." But that is what is currently happening. (By the way, no one is covering these issues better than Jerry Coyne, emeritus professor of evolutionary biology at the University of Chicago. I urge everyone to sign up at https://whyevolutionistrue.com/ to see his daily postings.)

There are many other ways scientific merit is under attack due to social justice dogmatism and identitarianism, including forcing scholars to write muster-passing Diversity, Equity, and Inclusion (DEI) statements before being considered for university postings. Here's a hint: embracing Martin Luther King Jr.'s admonition to treat everyone equally with dignity and respect without regard to skin color is considered a Giant Fail by the DEI bureaucracy.

We are individuals, not a collection of demographics and immutable characteristics. It is time to stop lumping people who look somewhat similar into affiliation groups and making sweeping generalizations about who they are, what they've experienced, what they care about, and how they think. Mostly you'll just be presumptuous and wrong.

This capture of science by the ideology of the moment is a dangerous trend. It is not only bad for science, it is bad for society: divisive, anti-meritocratic, and causing scientists to self-censor and conform their findings to predetermined social justice demands. Science depends on us getting past this. Children around the world who would benefit from golden rice and other GMO advances depend on us getting past this. I hope it's soon. ■

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[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell, PhD, has used his training at more than a dozen detective schools (including studies in forensic anthropology, fingerprinting, firearms comparison, undercover role-playing, trial testimony, and much more) to solve homicides, forgeries, myths, and other mysteries for over half a century.

Detective's Sidekick: Remembering My Late Wife, Diana Harris

No one could investigate strange mysteries for over half a century like I have without considerable assistance. Here, I want to again acknowledge the contributions of my late wife Diana Harris, who "helped in ways too numerous to mention" (as I wrote in the Acknowledgments of my book *Tracking the Man-Beasts* [Nickell 2011, 11]). She died on May 26, 2023.

Diana Gawen Harris (1946–2023) was the love of my life. We were college sweethearts at the University of Kentucky in 1966, when she left me to return to her previous boyfriend. I never got over her. Fast-forward some thirty-seven years, and I learned the possibility of her first child being *my* daughter. That was subsequently confirmed by DNA. After Diana ended a second bad marriage (I was myself divorced), we became engaged on a carnival Ferris wheel (Figure 1). We married forty years late, on April Fool's Day 2006. We had fourteen happy years before dementia struck and her life went seriously downhill until she died not long after our seventeenth anniversary. The following are some vignettes—happily and sadly remembered—of our having worked together.

Creating Undercover Identity

Diana often helped with my undercover role-playing—including disguise. A good example occurred just after we had embarked on our honeymoon! I had agreed to go undercover for National Geographic Television at the appearance of Brazilian healer John of God in Atlanta on April 4, 2006. I paid for admission using Diana's credit card, adopting the surname Harris. She helped with a disguise, as my frequent media appearances had made me too recognizable. After I put on the requested white outfit, Diana changed my hairstyle and added heavy glasses from my disguise kit. I also used a cane. (She then went to visit family in Atlanta while I played my part.)

Shrewdly, the alleged healer avoided his usual stunts, such as twisting forceps up someone's nose or scraping the white of an eyeball with a blunt knife—lest he risk trouble with authorities. I would later explain his tricks on camera. (For instance, I had a carny sideshow man demonstrate the forceps stunt, which is possible due to the presence of the sinus cavity.) Many "healings" depended on suggestion and distraction. The pricey "holy water" that was sold proved quite ordinary. In time, John of God would run afoul of the authorities in Brazil and be slapped with a long prison sentence. I like to think that Diana and I, in assisting National Geographic TV, played a part in that (Nickell 2013, 213–218).

Investigating Together

Diana had grown up in the Bahá'í faith, and when I told James Randi this, he said of us, "Oh, a Bahá'í, and a Below!" Diana and I had little problem with our differing beliefs. She was always willing to assist me in my investigative work, being in fact a talented asset. We often went on educational jaunts to experience the religious practices of others. Examples of these "Religabouts" included a tent revival, an old-fashioned river baptism, a Jehovah's Witnesses training session, and many others.

At a Catholic evangelical healing service, I impulsively joined the lineup of hopefuls—but not before Diana quickly thought to take my camera from my upper sport-coat pocket. When the healer came to me, placing his hand on my forehead, I decided to see what would happen if I resisted the expected falling. Well, the healer pushed harder as the "catcher" came closer from behind, preventing me from stepping back. And so, I fell backward into his arms. Diana's picture preserved the dramatic moment, complete with slight motion blur (see Nickell 2012b, 32). And I had learned a trick of the "going under the power" phenomenon.

Figure 1. Diana Harris and the author getting engaged at a carnival in Springfield, Illinois

Searching for Vampire Graves

In 2008, Diana and I investigated in Vermont. This was not a vacation, although interesting and scenic it indeed proved,

Figure 2. The author and his wife picnicking at "haunted" Seul Choix Point Lighthouse on Lake Michigan (watercolor sketch by Joe Nickell)

Reverie Painting (Remembering Diana)

JOE NICKELL

My window,
easily
an easel,
can show
to the mind's eye
a big-moon
sky
in ultramarine,
or again,
but for impasto,
yield a Van Gogh
some *Starry Night*.
Let
meteors' flight
create,
& us react
to an abstract,
or even
then,
unexpected,
your portrait face
reflected
at last,
in the waiting glass.

involving searches through old burying grounds and manuscripts kept in historical society archives. One story came from Woodstock, where sources claim a vampire's heart was burned on the public green about 1829. Another narrative told of Spaulding family members who were buried in a row in the Dummerston Center Cemetery. Allegedly, they were connected by a mysterious underground vine that grew from coffin to coffin. As the vine reached the last one buried, another family member would die. When finally a supposed remedy was applied—the last one being dug up and the vitals removed and burned—the next one got well and lived on for many happy years.

In these cases, the deaths were attributed to consumption (i.e., tuberculosis). However, the graves were not in fact placed consecutively in order of their deaths, as shown by a row of six Spaulding children's graves that Diana and I searched for and discovered. Neither did the last of those, Josiah, die very close in time to the previous child's demise. However, we learned he was indeed followed in death by a female sibling, who had lived on, moving with a second husband to Brattleboro—perhaps this being the secret of her having avoided the contagion! Diana took an excellent close-up photo of my making a rubbing of Josiah Spaulding's antique slate tombstone. The white chalk brought out at the top the incised, mythological image of the angel of death (Nickell 2011, 131–140).

'Haunted Lighthouse' Keepers

Lighthouses, remote sentinels on rocky shores, have been called "America's cas-

tles." Certainly they are places of scenic beauty, romance, and legend. And if many popular writers are to be believed, the spirits—of some keepers, shipwreck victims, and others—still maintain their lonely vigils there. I have profitably visited and investigated many of these sites. To gain extra investigative time at some of them, Diana and I were able to serve as live-in "assistant keepers." These were among the most pleasing and practical roles I have played as a ghost hunter. I know Diana agreed that these were romantic and forever-memorable times.

We were able to serve as such assistant lighthouse keepers for a few days in the remote Big Bay Point Lighthouse on Michigan's upper peninsula, perched on a cliff overlooking Lake Superior. We did the same at Thirty Mile Point Light on Lake Ontario. A bonus of the latter was access to a few years' worth of entries recorded in its guest books—or maybe I should say *ghost* books, given the various mentions, pro and con, of spooky phenomena. For other access, sometimes we got lucky, such as at Lake Michigan's Seul Choix Point Lighthouse (see Figure 2), where we were escorted up to the lantern room by Coast Guard maintenance men. (I believe those fellows would have agreed that Diana's charm was very effective in getting us this unique access.) As to the "ghosts" at the different sites, many are traceable to mental images superimposed on visual scenes and other simple phenomena (see Nickell 2012a, 107–118).

Getting a Forbidden Photo

Among reputedly miraculous images of Jesus—said to be *acheiropoietos* or "not made by hands"—was the Image of Edessa. Supposedly, Jesus miraculously imprinted it on a cloth for King Abgar of Odessa; unfortunately, this legend is unknown until the fourth century. Another legend holds that a woman named Veronica, pitying Jesus as he struggled with his cross on the way to his crucifixion, gave him her veil or kerchief with which to wipe his bloody, sweaty face, and so he left his image. (*Veronica* is a corruption of *vera iconica*—Latin for "true images.") Of many copies in the past, today two "originals" still exist, one in a church in Genoa, Italy, and the other often traveling in a Vatican exhibit. Over the years I have photographed both (Nickell 2013, 105–117).

The Vatican Image presented a problem when Diana and I went to view it. That was at an exhibition of "Vatican Splendors" in Cleveland, Ohio, on September 1, 2008. The image bore the title "The Mandylion of Edessa." The trouble was that signs prohibited photography throughout the exhibit. Perhaps not surprisingly, I have found ways around such prohibitions (for example, once in Russia, in a Russian Orthodox Church, by paying a bribe). In this case, my intrepid Diana knew just what to do. She singled out the uniformed guard stationed in that particular gallery. As she chatted with him, she maneuvered skillfully until she had him with his back to the holy picture. As I made my snapshot, daring a flash, some patrons glared at me disapprovingly. I returned a sort of idiotic "Oh I didn't know" look, but I had my picture.

* * *

In other cases, Diana assisted in so many additional ways: accompanying me for psychic readings, serving as an advance scout or as a seemingly independent observer, and so on and on—even as the driver of the getaway car! We also went on a few searches prompted by Bigfoot reports. In one case, the creature that we pursued in February 2008 (renting a cabin in the north Pennsylvania forest) turned out to have been, most likely, a black bear with mange (Nickell 2011, 62). Needless to say, I'll miss my intrepid companion until I, too, pass into that final night. ■

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The Mystery of the Vegetable Lamb

There was a time when people believed lambs grew on trees. Sir John Mandeville, an English knight who lived during the reign of Edward III in the middle of the fourteenth century, writes in his memoirs of the many journeys over thirty-four years that led him to discover the remotest places in the then-known world, among what are now Asia Minor, North Africa, and India. It was on his way to the latter country, after passing through Catai (present-day China) and Tartary (Russia and Mongolia), that a curious incident happened. During the journey, he came across a very unusual plant that generated strange gourd-like fruits: "And when they are ripe, men cut them a-two, and men find within a little beast, in flesh, in bone, and blood, as though it were a little lamb without wool. And men eat both the fruit and the beast. And that is a great marvel. Of that fruit I have eaten, although it were wonderful, but I know well that God is wonderful in His Works" (quoted in Lee [1887] 2008).

According to scholars, Mandeville probably never even existed[1]—or, if he did, he only imagined many of the things he wrote about. His tales may have been inspired by Marco Polo (Higgins 2011).

Many believed the Tartar vegetable lamb, also known throughout the Middle Ages as the Scythian lamb or barometz, was real. This animal-vegetal hybrid was discussed by naturalists and scholars, some of whom claimed to have even observed and examined it closely. Obviously, today we know there is no such thing and never has been. But for centuries, laypeople and scholars alike believed those stories (and a great many other similar ones, including stories about plants from which geese and even human embryos were said to be born)[2] were true.

All right, but how could they be so sure? In the end, no one had ever actually seen, collected, or publicly displayed even a single specimen of such wonders.[3] We can only try to explain the world based on available knowledge or what we *think* is available knowledge.

Perhaps the first seed of the legend of the vegetable lamb was planted when Ctesia of Knidos, the most important disseminator in the West of news about India, described the plants as "wool-bearing trees" when the ancient Greeks first discovered cotton during their many contacts with India. As the centuries passed, after the long isolation following the fall of the Roman Empire, it is not hard to imagine that increased trade between the East and West led some Europeans to put two and two together to make five. Their garments were made from the wool of sheep, which are animals, but here come merchants from the East loaded with what looks like wool (i.e., cotton) that they explain is made from specific, unknown plants. What could they infer from this? That Tartary sheep are born from plants! Quite logical in its own way (and time).

German naturalist Engelbert Kaempfer, who in 1683 on the orders of King Charles XI conducted a systematic search in Asia Minor, put an end to the legend of the vegetable lamb. He established that there was simply not a single vegetable lamb in the world (Carrubba 1993).

It took, in short, centuries to determine that those interpretations of reality were, indeed, just legends. The fact is that when we do not know something, sometimes we do not even realize that there is something to know; *we don't know what we don't know.*

Today, with the mind-boggling amount of information accumulating at every given moment, it is easier for each of us to realize how much we have yet to learn. Therefore, it should also be easier to learn what we previously didn't know. But until recently, when we did not know something, we would settle for provisional explanations. And if a large enough number of people found those tentative explanations reasonable—and perhaps of greater comfort than a larger framework of beliefs—they ended up becoming consensual realities. After all, spontaneous generation[4] (the idea that life could arise from inanimate natural elements) was part of most people's cultural worldview. They all *knew* that rotting flesh could generate flies and that salamanders arose from burning embers. In fact, they could see it with their own eyes! Why, then, could plants not produce lambs?

These kinds of stories help us better understand how knowledge is formed; we observe the world and, through reasoning, develop hypotheses. And until the seventeenth century, we stopped there, at least until Galileo, Descartes, and Bacon revolutionized the way of knowing the reality of the world by introducing an experimental method—the scientific method. The issue is not that the beliefs of past great civilizations were all wrong. Even in antiquity, there were great scientists, especially in Greece, such as Archimedes, Euclid, and Pythagoras, but truth was often mixed indistinguishably with legends and falsehoods. There was no criterion for separating fact from opinion, what one *believed* from what one could *prove*. The *ipse dixit*, the authority of a scholar, was valid: the idea was that such an intelligent person could never be wrong.

What was missing, then, was a sieve—a system capable of independently filtering the validity of research from discovery. The extraordinary revolution for human thought introduced with the scientific method is, therefore, equivalent to this sieve and consists essentially in the fact that once a hypothesis has been formulated to explain a phenomenon, one does not stop there but puts that hypothesis to the test through experimental control. One accumulates observations (Galileo's *sensible experiences*), forms a hypothesis, and conducts experiments capable of confirming or disproving it. That achievement literally changed the world. ■

Notes

1. According to one popular hypothesis, Sir John Mandeville was the pen name of another author, possibly the Flemish Benedictine monk Jan de Langhe (ca. 1300–1383), a prolific writer and collector of travelogues. Whoever was the real author of *Travels, or Treatise of the Most Wonderful and Most Notable Things to Be Found in the World*, it is believed that he was indeed influenced by the accounts of travelers, especially to the Holy Land and Egypt, who had come before him or were his contemporaries and, therefore, may have told at least partially authentic facts. The book met with incredible success, to the point that Christopher Columbus himself would later say he was greatly influenced by reading one of the many translations of the text published over time.

2. In the treatise in which he refutes the legend of the vegetable lamb, Henry Lee (Higgins 2011, 7) cites a passage, written by a thirteenth-century Jewish commentator, Rabbi Simeon, in which he still speaks of a plant that has fruits resembling gourds or melons inside of which is a creature known as a jadua: "Only the jadua has, to all intents and purposes, human form, in face, body, hands and feet."

3. In fact, at the Museum of Garden History in London there is a specimen dating back to the nineteenth century of *Cibotium barometz*, a lanuginous plant, a type of fern native to China and Malaysia, which has taproots, usually four or five, that may resemble, with a bit of imagination, a small embryo of a lamb. Perhaps the existence of forgeries of this type even in the Middle Ages could have helped to entrench the idea of the plant lamb (reported by Ivan Cenzi in "Bizarre Bazaar," YouTube, November 5, 2009).

4. The belief of "spontaneous generation" was initially refuted by Francesco Redi in 1668 and then was only finally debunked by Louis Pasteur in 1864.

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[THE PHILOSOPHER'S CORNER MASSIMO PIGLIUCCI

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Feng Shui, Demarcation, and Virtue Epistemology

Feng shui means "wind" and "water." The goal of feng shui is to obtain water and store the wind, but it's unclear what exactly that means. A place with good feng shui supposedly brings good luck, while one with bad feng shui brings bad luck. The practice depends on the underlying concept of *qi*, a kind of vital force fundamental in Chinese philosophy, treated as the basic constituent of the universe. Sindhuja Bhakthavatsalam and Weimin Sun (2021), in a paper published in *Science & Education*, used feng shui to introduce readers to the concept of virtue epistemology as a different way to look at the infamous demarcation problem, the quest for what differentiates science from pseudoscience.

One current way to think about pseudoscience is that it is a "doctrine whose major proponents try to create the impression that it represents the most reliable knowledge on its subject matter" (Hansson 2013). While standard approaches to demarcation attempt to uncover universal criteria that distinguish science from pseudoscience, there is another way to go about it: turn the focus on the epistemic agent, the practitioner of pseudoscience. The goal of this approach, often referred to as virtue epistemology, is to improve epistemic conduct, our own as well as that of others. We do so by paying attention not so much to whether a given notion is right or wrong but to whether the agent has acted virtuously or viciously when arriving at (and defending) that particular notion.

Back to feng shui for a moment. Bhakthavatsalam and Sun argue that both providers and consumers of feng shui engage in epistemic vices. For instance, it's a well-established fact that there is no agreement among providers about the actual practice, with different "masters" giving contrasting advice under similar conditions. One would think that this should worry the practitioners just as much as the consumers. Yes, there is no attempt within the field to arrive at a consensus, a good example of the vice of intellectual isolationism, or lack of willingness to engage with others, including one's own (alleged) peers.

As Bhakthavatsalam and Sun put it:

> Maintaining strong ontological or even empirical commitments to concepts not rooted in any kind of empirical support clearly shows lack of reasoning, intellectual dogmatism, laziness, indifference, obtuseness, or some combination of these. … The majority of these people lacks key epistemic virtues such as curiosity, open-mindedness, and impartiality. They often exhibit epistemic vices such as gullibility, overly relying on (questionable) authority, and being carried away by bias and prejudice. (Bhakthavatsalam and Sun 2021, 1440)

Or consider this description by Quassim Cassam of a typical conspiracy theorist: "He ignores critical evidence because he is grossly negligent, he relies on untrustworthy sources because he is gullible, he jumps to conclusions because he is lazy and careless. He is neither a responsible nor an effective inquirer, and it is the influence of his intellectual character traits which is responsible for this" (Cassam 2016, 164).

Fine, but what, exactly, is a *virtue*? In moral psychology, it is defined as a stable behavioral disposition, or "competence," of an agent. When you say, for instance, that your friend is a generous person, you mean that, other things being equal, she behaves generously, for instance by devoting her time, money, or other resources to other people or to socially worthy causes.

Virtues, then, pertain to individuals who should want to be virtuous because that's good for them, first and foremost. Part of the perennial problem of pseudoscience is to understand why its practitioners are content with what are obviously unvirtuous epistemic traits, such as engaging in rationalizations rather than logical thinking. It is all about character, what shapes it, how to improve it, and what may motivate people to work on it.

A major aspect of the idea is that bad epistemic practices are the reflection of underlying epistemic vices, so that iden-

tifying the vices goes at least some of the way toward explaining the practices. For instance, failure to consider alternative explanations for certain phenomena may be the result of negligence or dogmatism. Cherry-picking data may reflect prejudice or confirmation bias. Sharing untested or unjustified claims on social media may be linked to dishonesty and epistemic arrogance. And so on.

Of course, nothing insulates scientists themselves from indulging in epistemic vices, hence the occasional scientist engaging in vaccine or climate denialism. But now that we look at those cases from the point of view of virtue epistemology, we have an account of why there always are minoritarian groups of such otherwise legitimate scientists: again, it goes down to their character. A curious byproduct of virtue epistemology is that it turns out that there are cases when *ad hominem* arguments, usually considered an informal logical fallacy, are in fact justified: an attack on the (epistemic) character of a vicious agent becomes legitimate because it is part of the overall argument for why the public should not trust that agent.

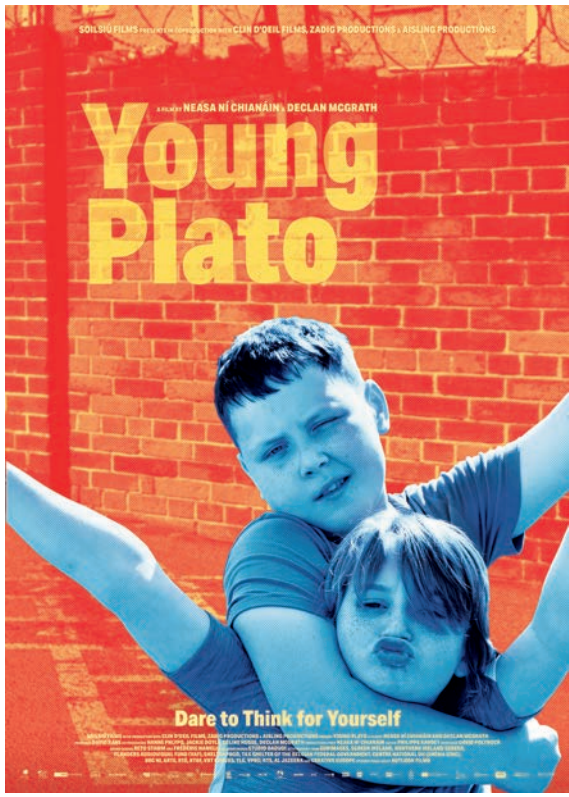
As an example, take the infamous case of vaccine denialist Andrew Wakefield. When talking about vaccines, it is perfectly reasonable not only to present scientific facts about the efficacy and safety of vaccines but also to point out that one of the major driving forces behind the anti-vaxx movement is a known fraud. This isn't unwarranted character assassination; it is pertinent information that helps people make up their minds about the controversy.

The obvious question then becomes: How do we use virtue epistemology to improve things? Several suggestions have been made in this regard. One way to look at the issue is structurally. Sustained progress will be made only once we focus our attention on the educational institutions that currently fail to teach virtue epistemology (or, indeed, virtue ethics more generally), not just on individual malpractice. Yes, we can point to epistemically vicious individuals, but the broader issue is how come so many *consumers* of pseudoscience are themselves epistemically unvirtuous. The idea is that we should engage in epistemic engineering: changing the educational environment to promote virtue.

One excellent example of how to do this can be seen in the documentary *Young Plato* (2021), which focuses on how the principal of an elementary school in Belfast decided to start teaching practical philosophy to his kids. The results were immediate and heartwarming. It should be obvious that the best way to change things for the better in the long term is to teach virtue epistemology to young kids so that a new generation arises that values intellectual and epistemic virtues from the get-go. Instead, most of our efforts are aimed at debunking the convictions of adults, who are typically entrenched in their worldview and insulated from skeptical criticism.

Along similar lines, Bhakthavatsalam and Sun in their paper make the practical, and perhaps counterintuitive, suggestion of teaching pseudoscience at the pre-college level, with an emphasis on contrasting epistemic virtues and vices. Instead of shielding our kids from pseudoscience, we should actively expose them to it, under guidance, so that they more readily develop the necessary critical thinking skills to properly handle it as adults. Let them read pro-pseudoscience papers, dissect them, compare them to actual scientific papers, and draw their own conclusions about the reliability of sources, the soundness of experimental procedures, and the like.

Another researcher, Alessandra Tanesini (2016) has surveyed the available educational literature in this context and has identified four common approaches that have been fruitfully utilized by educators: (i) Direct and formal instruction about the virtues, where kids are introduced to the very concepts of virtue and virtue ethics; (ii) Exposure to role models, such as Carl Sagan, so that students have several examples to emulate in their own epistemic practices; (iii) Actual practice of virtuous behaviors, guided or supervised by the teachers, with the goal of developing intellectual honesty, conscientiousness, respect for factual accuracy, and the like; and (iv) Enculturation into virtue, so that kids begin to adopt the virtue ethical approach not just when it comes to epistemological problems but in every aspect of their behavior, the goal being to help develop better characters and prepare them to be better citizens of an open society.



There is a significant amount of literature in developmental psychology backing up the notion that virtues are character traits that we can work on and improve, no matter what baseline we start with as a result of genetics and early upbringing environment. What makes us functional adults is that we become responsible for our virtues and vices, own up to them, and strive to improve. ■

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[BEHAVIOR & BELIEF STUART VYSE

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Rhinos and Radium: A Skeptic's Tour of Paris, Part II

Credit: Arthur Weidmann

In summer 2021, not long after the first COVID-19 vaccines became available, I made my first trip to Paris, France; when I returned home, I wrote "French Science & Pseudoscience: A Skeptic's Tour of Paris" for Skeptical Inquirer (Vyse 2021). In fall 2023, I went back to Paris and continued my tour of scientific and pseudoscientific locations in the City of Light.

Grande Galerie de l'Évolution

France has a museum dedicated specifically to evolution. As far as I can tell, the United States does not. In Williamstown, Kentucky, we have Ark Encounter where you can "experience bible history at the life-size Noah's ark"; in Santee, California, we have the Creation and Earth History Museum "dedicated to the Biblical account of science and history"; and just a few steps off the National Mall in Washington, D.C., we have the enormous high-tech Museum of the Bible. All these institutions present a creation story that is quite different from that told by Charles Darwin, but when I Googled "museum of evolution United States," two of the nine featured museums were creationist museums. The rest were natural history museums, such as the American Natural History Museum in New York, the Smithsonian Museum in Washington, D.C., and the Field Museum in Chicago. All these institutions endorse and cover Darwinian evolution, but there is no museum of evolution in the United States. In contrast, when I Googled "museum of evolution France," the Grande Galerie de l'Évolution, Paris, is the first listing.

To be perfectly accurate, the Natural

History Museum in Paris (Muséum national d'Histoire naturelle) is a campus of several buildings surrounding a large garden of plant species. The largest of these buildings is the Grande Galerie de l'Évolution. Previously a zoology museum, it was opened as a building dedicated to evolution in 1994, and as part of its twentieth anniversary, the building was remodeled in 2014. The current structure retains the beaux-arts façade shown above but is a gleaming modern building inside. The exhibits are very family-friendly, with large dinosaur skeletons and models, brightly lit interactive exhibits, and areas that are designed specifically for young children. Much of the content is devoted to displaying the lines of descent of various species and the diversity of life. One floor documents the effects of humans on evolution through hunting, pollution, climate change, the transportation of species from one place to another, and transformations of the landscape. One room is devoted to endangered and extinct species.

The Grande Galerie de l'Evolution is a marvelous museum that is fun and educational for all ages. The day I visited, many families were in attendance. Highly recommended.

The central hall of the Grande Galerie de l'Évolution (credit: Luc Potage)

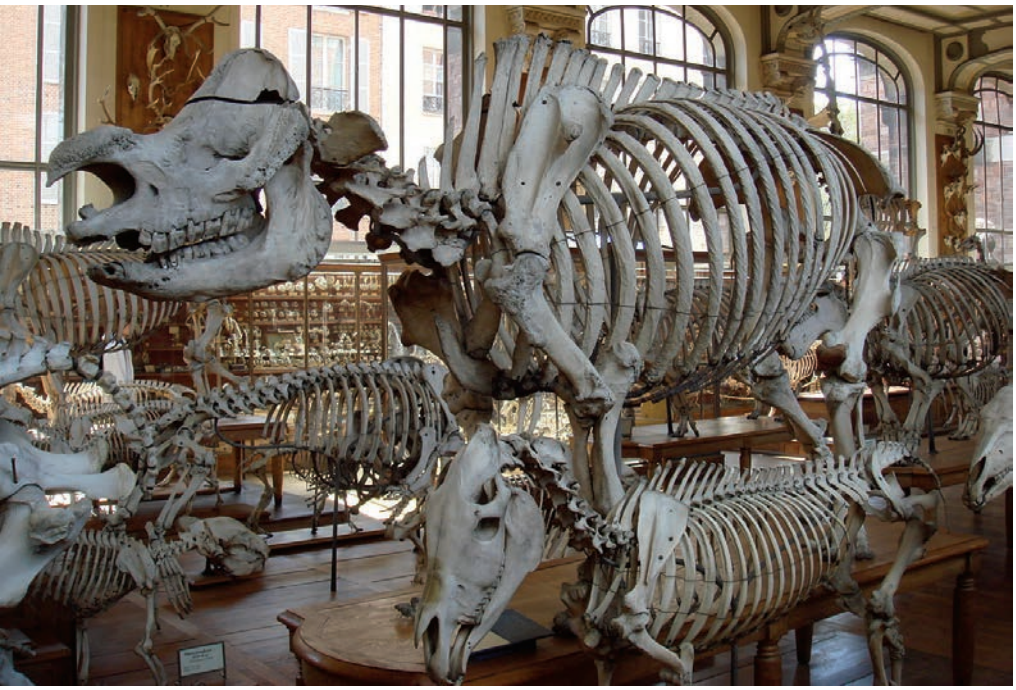
Whale skeletons in the Gallery of Paleontology and Comparative Anatomy (author photo)

Galerie de Paléontologie et d'Anatomie Comparée

I did not visit all the galleries of the National History Museum, but friends who had been to Paris earlier in the year recommended the Gallery of Paleontology and Comparative Anatomy (Galerie de Paléontologie et d'Anatomie Comparée). This turned out to be a great suggestion. Located at the opposite end of the Natural History Museum campus from the evolution museum, this red brick building offers an old-style static presentation of animal skeletons, but the collection is pretty eye-popping.

Among the many interesting displays is the skeleton of King Louis XV's rhinoceros (Péquignot 2013). Born in approximately 1769 in the Bengal region of South Asia, the rhinoceros was transported to France at great expense to live in a menagerie on the grounds of the king's palace at Versailles. However, during the French Revolution, the menagerie was seen as a symbol of royal tyranny, and many of the animals were freed or killed. By 1792, the king's rhino was among the few animals that remained, and it was eventually agreed that the rhinoceros should be made available to the public. Plans were hatched to bring it to the garden on the grounds of the Natural History Museum, but the rhinoceros died under somewhat mysterious circumstances before this plan was completed. After dissection, a taxidermist stuffed the body, and today, the stuffed Rhinoceros of Versailles is on display in the Grande Galerie de l'Évolution. Its skeleton resides at the other end of the campus in the Galerie de Paléontologie et d'Anatomie Comparée. (I will have more to say about rhinos later in this article.)

Other attractions of the museum



Skeleton of the rhinoceros of Louis XV (1769–1792) (credit: Uploadalt)

include a cast of a T. rex skull, a full-sized mastodon skeleton, a comparative exhibit of brains of different species, and a section on Tératologie (the science of "monsters"), which displays various forms of abnormal development in humans and other species. This last exhibit is not for everyone, but I found it fascinating—which may tell you something about me. In the interest of good taste, I will not include my photo of the sculpture of Rita and Cristina Parodi, conjoined twins who survived only six months during 1829 in Paris.

The Galerie de Paléontologie et d'Anatomie Comparée is somewhat less suited to young children—unless they are dinosaur fans—but will be of interest to many adults.

Museum of the History of Medicine

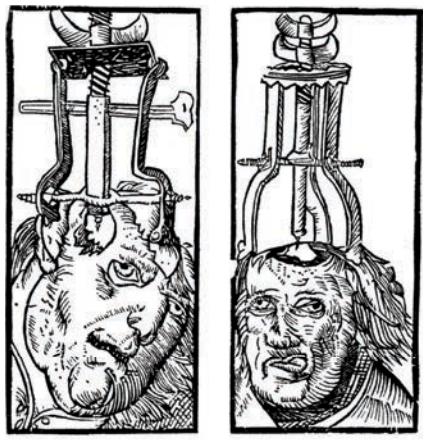
On my previous trip to Paris, I wanted to visit the Museum of the Institut Pasteur and the Musée de l'Histoire de la Médecine at the Université Paris Cité, but in 2021 both were taking advantage of the COVID-19 pandemic to do renovations. The Pasteur museum was still closed during my second trip, but the Museum of Medical History was open.

The primary attraction of the medical history museum is a large collection of medical instruments, some of them dating back to ancient times. As a psychologist, I was particularly interested in the museum's collection of trepanation kits. Trepanning is the ancient practice of boring a hole through the skull of the patient. Archeologists have discovered evidence of trepanning as early as the Bronze Age and in cultures all over the globe, but the purposes of these surgeries are somewhat difficult to determine (Liston and Day 2009). Some physical conditions may have been treated this way, such as hydrocephalus and tumors, but it is likely that many of these surgeries were aimed at psychological problems. Somewhat shockingly, these brutal methods were not limited to ancient or medieval times. An 1894 British medical text entirely devoted to trepanning includes a chapter on the use of this procedure for "Epilepsy, Paralysis, Idiocy and Mania" (Horne 1894).

Evidently, physicians who practiced trepanning in the eighteenth and nineteenth centuries carried briefcase-sized kits that contained all the instruments one might need to complete the operation. The museum had several of these trepanning kits on display.

I was also interested in a display of ear horns attributed to the famous French physician Jean Marc Gaspard Itard (1774–1838), who developed the horns in his work with the deaf. Itard is most famous for working with Victor, the Wild Boy of Aveyron, a feral child whom Itard attempted to educate. This episode has been widely documented in books and films, including Harlan Lane's excellent book *The Wild Boy of Aveyron* (1979) and François Truffaut's 1970 film *The Wild Child*, in which Truffaut plays Dr. Itard. Itard is widely considered to have launched the modern field of the education of people with intellectual disabilities (Barrett et al. 1992). Using methods akin to modern behavior modification, Itard was able to make great improvements in Victor's behavior but remained disappointed that he was unable to teach the boy to speak.

The medical history museum has a

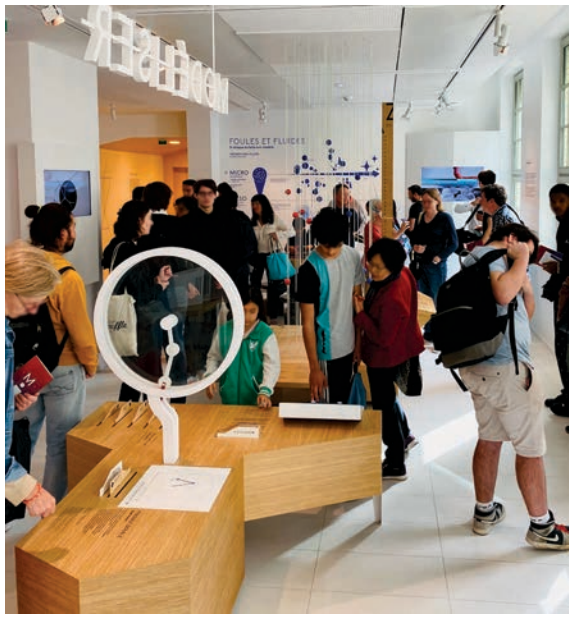


Engraving by Peter Treveris of a trepanation from Heironymus von Braunschweig's Handywarke of surgeri (Wikimedia)

Eighteenth-century trepanning kit showing instruments for drilling holes into skulls (author photo)

Ces appareils acoustiques, dont l'un est conçu à partir d'une coquille, sont dus à J. ITARD (1775-1838), auteur du « Traité des maladies de l'oreille et de l'audition » (Paris, 1821). Il inventa une sonde métallique permettant de cautériser la trompe d'Eustache.

Ear horns used by Dr. Jean Marc Gaspard Itard in his work with the deaf



Visitors at the Maison Poincaré on opening day (author photo)

wealth of interesting artifacts that highlight how far medical practice has come in the past century, but this, too, is an older museum that lacks the kind of interactive child-friendly exhibits that would amuse the younger set. On the day I was there, a woman brought her teenage son—perhaps hoping to inspire interest in a medical career—and although the mother was obviously enthralled by the exhibits, the child could not be bothered.

Portrait of Victor of Aveyron from the frontispiece of Jean Itard's book *De l'éducation d'un homme sauvage* (1801)

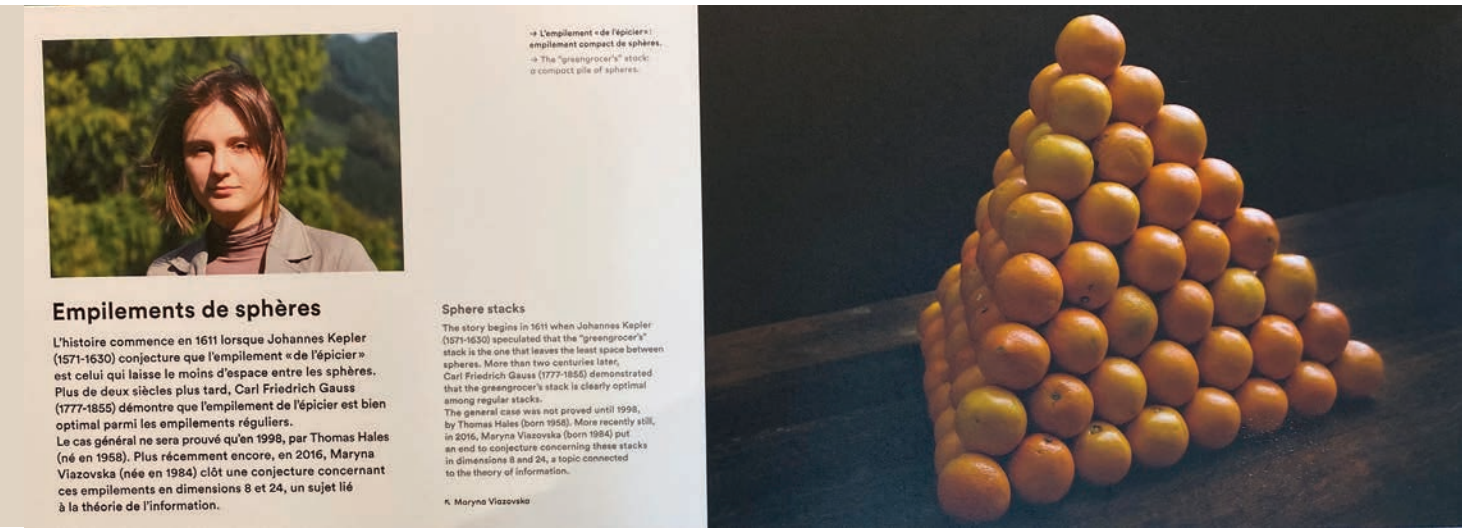
Maison Poincaré

By fortunate chance, I was in Paris on the weekend that a new museum, Maison Poincaré (Poincaré House) opened on the grounds of the Institute Henri Poincaré, a center for research in mathematics and theoretical physics located just a few blocks from the Pantheon in the fifth arrondissement. France has a long history of producing notable mathematicians, and Poincaré is perhaps the most famous of all. He is remembered for the Poincaré conjecture, a problem posed in 1904 that remained unsolved for almost a century until the Russian mathematician Grigori Perelman posted a solution in 2002. Poincaré is also known for having spoken out during the famous trial of Alfred Dreyfus, who was unjustly accused of treason in 1894 and eventually exonerated a decade later. Poincaré argued that spurious scientific evidence had been used to convict Dreyfus.

Maison Poincaré is a relatively small four or five rooms spread over two floors, but consistent with the museum mission of popularizing mathematics, it is filled with interactive displays—many labeled both in French and English—that are inviting for children and adults. The displays often highlight mathematical problems that are easy to understand and portraits of working mathematicians. The panel on the next page features Johannes Kepler's (1571–1630) proposal that the grocer's method of stacking oranges in a pyramid produced the least possible space between oranges. The problem was eventually proved for three-dimensional space in 1958, and in 2016, the young Ukrainian mathematician Maryna Viazovska (pictured) produced proofs for the "sphere-packing problem" for eight-dimensional and twenty-four-dimensional space. In 2022, Viazovska became only the second woman to win the Fields Medal, often considered the Nobel Prize for mathematics.

Speaking of awards, after he was finally credited with having solved the Poincaré conjecture, Grigori Perelman won several awards, including the Fields Medal and the Clay Mathematics Institute's Millennium Prize, which came with a check for $1,000,000 U.S. dollars. However, being something of an iconoclast, Perelman has declined almost all the mathematics awards he's been offered, including both the Fields and the Millennium prizes. Presented with this unexpected outcome, the Clay Institute used Perelman's Millennium prize money to endow a research position at the Henri Poincaré Institute. His unclaimed prize is on display at the Maison Poincaré.

The Maison Poincaré is highly rec-


→ L'empilement « de l'épicier » :
empilement compact de sphères.
→ The "greengrocer's" stack:
a compact pile of spheres.
Empilements de sphères
L'histoire commence en 1611 lorsque Johannes Kepler (1571-1630) conjecture que l'empilement « de l'épicier » est celui qui laisse le moins d'espace entre les sphères. Plus de deux siècles plus tard, Carl Friedrich Gauss (1777-1855) démontre que l'empilement de l'épicier est bien optimal parmi les empilements réguliers.
Le cas général ne sera prouvé qu'en 1998, par Thomas Hales (né en 1958). Plus récemment encore, en 2016, Maryna Viazovska (née en 1984) clôt une conjecture concernant ces empilements en dimensions 8 et 24, un sujet lié à la théorie de l'information.
Sphere stacks
The story begins in 1611 when Johannes Kepler (1571-1630) speculated that the "greengrocer's" stack is the one that leaves the least space between spheres. More than two centuries later, Carl Friedrich Gauss (1777-1855) demonstrated that the greengrocer's stack is clearly optimal among regular stacks.
The general case was not proved until 1998, by Thomas Hales (born 1958). More recently still, in 2016, Maryna Viazovska (born 1984) put an end to conjecture concerning these stacks in dimensions 8 and 24, a topic connected to the theory of information.
K. Maryna Viazovska

Panel describing the sphere-packing problem featuring mathematician Maryna Viazovska, who solved the problem for eight- and twenty-four-dimensional space (author photo)

ommended for people of all ages who have an interest in mathematics, either as a topic of study or as a profession.

Musée Curie

Just around the corner from the Maison Poincaré, you will find the Radiation Institute, which is home to the Musée Curie, devoted to the Curie family's contributions to the study of radioactivity.

THE CLAY MATHEMATICS INSTITUTE
HEREBY AWARDS THE MILLENNIUM PRIZE FOR THE
RESOLUTION OF THE POINCARÉ CONJECTURE TO
GRIGORI PERELMAN
$M \cong S^3$
$\pi_1(M) = 0$
THE POINCARÉ CONJECTURE:
If a smooth compact 3-manifold is simply connected,
then it is homeomorphic to the 3-sphere.
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Landon T. Clay Lavinia D. Clay

Grigori Perelman's unclaimed Millennium Prize at the Maison Poincaré (author photo)

Marie Curie was born Manya Sklodowska in Russia-occupied Warsaw, and although it soon became clear that she was a prodigy, she had to study at a secret "Floating University" that was hidden from the Russians. She worked as a governess until the age of twenty-four when she had saved enough money to go to Paris and enroll in the Sorbonne. She earned a degree in physics in 1893, and in 1894 she met Pierre Curie, a thirty-five-year-old physicist. The couple were married in 1895, beginning a dual collaboration—at home and in the laboratory—that was scientifically productive but brought Marie considerable criticism. After her children were born, she was accused of not loving them because she spent so much time in the laboratory (Des Jardin 2011).

In 1898, Marie Curie discovered two new elements, polonium—which she named after her native country—and radium. Her husband dropped his research on crystals to aid Marie in isolating these elements, and they collaborated on the publications announcing the discoveries. Marie and Pierre were jointly awarded the Nobel Prize in physics in 1904, making Marie the first woman to receive the award, and in 1911, five years after her husband's death, Marie was awarded the Nobel in chemistry, making her the first person to win two Nobels and the first to win Nobels in two separate disciplines. Marie and Pierre's eldest daughter, Irène Joliot-Curie, also became a physicist, and she and her husband, Frédéric Joliot-Curie, won the 1935 Nobel Prize in chemistry. With a total of five Nobel Prizes scattered among four family members, the Curies hold the all-time family record for Nobels. Of course, Marie Curie received many other awards during her lifetime and, in 1921, made a six-week tour of the United States, during which she was given several honorary doctor-

A Nobel laureate family portrait at the Curie Museum. From left to right are Pierre Curie; Marie Curie; their daughter, Irène Joliot-Curie; and her husband, Frédéric Joliot-Curie. Among them, they received five Nobel Prizes (author photo).

ates and other accolades.

The lives of the Curies were not confined to the laboratory. When World War I arrived, Marie set up portable X-ray stations that helped field surgeons find shrapnel in wounded soldiers. She would ultimately establish 200 X-ray stations during the war (Des Jardin 2011). As one might expect, Marie's daughter, Irène Joliot-Curie, was an ardent feminist, and although French women did not receive the right to vote until 1945, she became the Undersecretary of State for Science, advocating on behalf of scientific research. In the 1930s, both she and her husband spoke out publicly in opposition to the rise of fascism and Nazism in Europe (NobelPrize.org n.d.).

Although X-rays had been applied for the treatment of cancer before the identification of radium, Marie Curie's discovery accelerated the course of radiation therapy (Gianfaldoni et al. 2017). Unfortunately, the excitement about radium also encouraged a variety of quack therapies at a time when the dangers of radiation were poorly understood.[1] The Curie Museum covers this pseudoscientific aspect of the history of radium with a display of advertisements, such as for Tho-radium creams and powders recommended by "Docteur Alfred Curie"—who, if he existed at all, was not related to the famous Curies.

The Curie Museum is definitely worth a visit, especially if you also plan to visit Maison Poincaré on the same day. The museum is small, but entry is free. After your visit, if the weather is nice, walk around behind the building and sit in the Jardin Marie Curie. Madame Curie created this small garden between several physics, chemistry, and biology research buildings for relaxation and the exchange of ideas.

Extra: Dürer's Rhinoceros

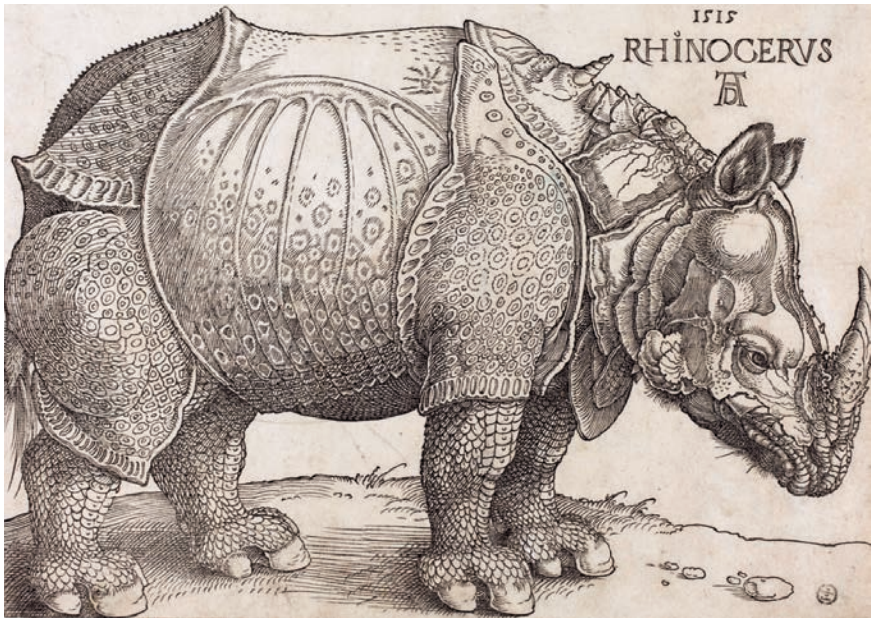
As part of my trip, I visited the Petit Palais, an art museum in the heart of Paris. The permanent collection of the Petit Palais includes one of my favorite paintings, *Les Halles* (1895) measuring fifteen feet by twenty-two feet, by Léon Augustin Lhermitte (1844–1925), which depicts a cluttered scene of what was once the central fresh food market in Paris. Today, the Centre Pompidou, a museum of contemporary art, stands were Les Halles once was.

This visit was not intended as part of my scientific tour of Paris, but as luck would have it, the Petit Palais featured a temporary exhibit called "Treasures in Black and White," which consisted of items from the museum's extensive graphic arts collection, including works by Rembrandt, Francisco Goya, and Henri de Toulouse-Lautrec. One of the most striking and recognizable of the prints on display was Albrecht Dürer's 1515 woodcut of the rhinoceros of Lisbon. The story of this print reveals an interesting zoological mystery.

A quick look at Dürer's woodcut reveals several inaccuracies. Among other things, the rhino appears to be covered

People relaxing in the Jardin Marie Curie. The busts in the background are of Marie and Pierre Curie (author photo).

Léon Augustin Lhermitte's 1895 painting ***Les Halles***, part of the permanent collection of the Petit Palais (Wikimedia)



Albrecht Dürer's 1515 woodcut of the rhinoceros of Lisbon (Wikipedia)

with plate-like structures, its legs are covered with scales, and an extra horn emerges from its back. Rhinos were rarely seen in Europe. Due to their large size, transporting them from Asia to Europe was exceedingly difficult, and the rhinoceros of Lisbon was the first to arrive in Europe since the third century. Dürer's print was accomplished without the benefit of seeing the animal in person. Indeed, after the Lisbon rhinoceros arrived in Portugal, King Manuel sent it as a gift to Pope Leo X, but the animal drowned when the ship carrying it foundered off the coast of Italy. As a result, Dürer relied on descriptions by people who had seen the rhino (Ridley 2005).

From a scientific viewpoint, the popularity of Dürer's woodcut had a profound effect. For over two hundred years, European depictions of rhinoceroses showed the influence of Dürer's inaccuracies, but historian Glynis Ridley (2005) has proposed an alternative theory of Dürer's rhinoceros that acquits the artist of excessive fictionalizing. Ridley suggested that Dürer's rhino might appear not as it arrived from India but as it departed for Rome. Albrecht Dürer frequently painted and drew soldiers and knights in armor, and it was not uncommon for a knight's horse also to be fitted with armor. Ridley proposed that the Lisbon Rhinoceros might have been festooned with a suit of armor before leaving Portugal. It is impossible to know whether Ridley is right, but perhaps some skeptic will pick up this question and do the research necessary to sort it out.

***

There are many things to see and do in Paris, and science may not be the first thing on your list. But if you are so inclined, France's deep history in mathematics, science, and medicine is on display. After you've been to the Eiffel Tower and the Louvre, these less traveled places will not disappoint. ■

Note

1. Both Marie and Irène Curie died of diseases thought to be related to their long-time exposure to radioactivity: Marie at the age of sixty-six from aplastic anemia, and Irène at fifty-eight from leukemia.

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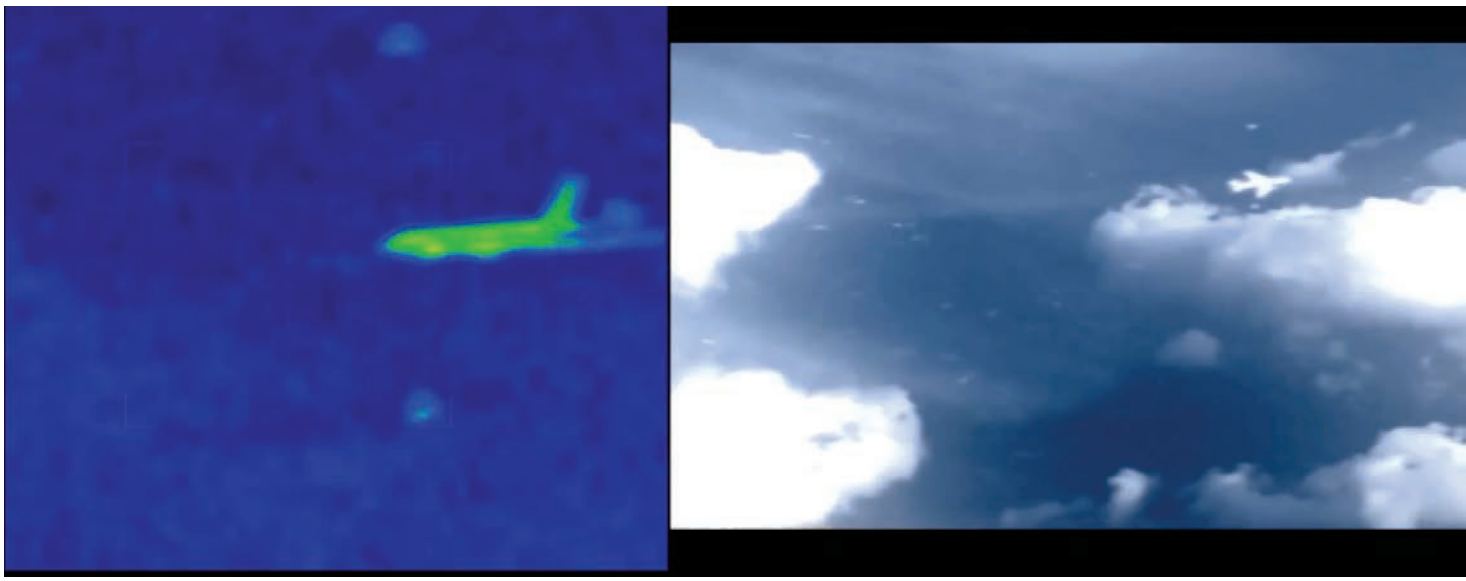
[THE PRACTICAL SKEPTIC MICK WEST

Mick West is a writer, investigator, and debunker who enjoys looking into the evidence behind conspiracy theories and strange phenomena and then explaining what is actually going on. He runs the Metabunk forum and is the author of the book *Escaping the Rabbit Hole*.

The MH370 Teleport Hoax



Still images from two faked videos of flight MH370

The idea that the missing Malaysian flight MH370 was abducted by aliens was one of those silly things that popped up shortly after the plane went missing. The obvious conclusion when a plane vanishes is that it must have crashed somewhere. But in the days after the disappearance, no trace was found.

This led to a wide range of speculation, perhaps driven in part by hope; if the plane had not crashed, then perhaps the passengers were still alive. Some suggested that it had been hijacked; others claimed it had flown through a black hole into another dimension (a theory actually discussed on CNN). Arguably the wildest theory was that it had been abducted by aliens (see Sword 2023).

None of these theories were backed by a shred of evidence. Eventually, parts of the plane washed up on distant shores, and it became apparent that it had crashed into the ocean. We may never know why.

MH370 went missing on March 8, 2014. Ten weeks after that, an anonymous YouTuber, RegicideAnon, posted a video that purported to be a stereo satellite image of a plane. The video (since deleted but still available on archive.org) shows some clouds over a blue ocean background. A plane, banking steeply, flies into view from the top left.

About fifteen seconds later, a white orb-like object flies in and begins to loop around the plane. It's joined a few seconds later by two more. The three orbs orbit the plane as it levels out; then there's a sudden flash of light, and the plane and orbs vanish without a trace.

It was a simple-looking fake, something any artist could knock out in a few days with common tools such as Blender and After-Effects. Most people recognized this and paid it very little attention. It had little impact but gained a steady trickle of views.

Three weeks later, a second video was released. This showed what looked like the same scene, but now from the perspective of a military drone filming with a thermal camera. Again, the plane flies into view, the orbs follow it, and then it vanishes in a flash. Again, most people assumed—quite correctly—that it was fake, and no one really paid it any attention.

That should have been the end of it. But fast-forward to 2023. People on the Reddit forum r/UFOs suddenly rediscovered the videos. Reddit user Voelkero posted links to the video and commented, "My hope is that some of you will be able to conclusively prove that it is faked."

Unfortunately, r/UFOs is not in the business of simply proving UFO videos are fake. With over two million members, the forum contains a wide variety of beliefs about the UFO phenomenon. So, instead of performing a neutral analysis of the videos, what happened next was an astonishing exercise in trying to

Part of a stock image from the 1990s was found to be used (and modifed) in the video.

prove they were real.

It started with Voelkero's thread. It quickly amassed thousands of posts. Redditors pored over the videos frame by frame (and sometimes pixel by pixel), looking for clues. Inconsistencies were found that initially raised suspicions. Those inconsistencies were quickly reinterpreted as amazing evidence that the videos were real. A mouse cursor slowly drifting, which was thought to be an animation error, was tortuously repackaged as proof that the video was recorded on a government system.

Multiple problems were found. The contrails behind the plane were not attached correctly in the fake and so wobbled around. While this alone was proof it was fake, it was waved away as some kind of artifact or atmospheric effect. The stereoscopic footage was found to be the same image left and right, just distorted to make it look stereo. Segments of the video were found to be cut and pasted from one frame to another. All these issues were tortuously explained away (with entirely specious arguments, which limited space will spare you from).

Debunked?

Then, someone found the smoking gun (or at least *a* smokier gun). In the thermal footage, when the plane vanished, there was a brief explosion or shockwave. The individual frames of this explosion had a curious wavy outline. One enterprising Redditor thought it looked familiar and went looking through an old special effects collection. He just wanted to find something similar. Instead, he found a perfect match.

The collection, called Pyromania, was well known in the 1990s. I'd used it myself in games I'd made in that decade. One of the effects showed a shockwave from an explosion. Put side-by-side with the fake footage, it was a match. The effect had been recolored and distorted but was inarguably the same image.

But argue they did. While some found this convincing, the hardcore doubled down. The pixels, they argued, were not exact, the colors were wrong, and other parts looked different. Even if there was a match, then perhaps the images were faked.

I tried to stay out of it—I really did. The videos seemed obviously fake, laughably so. I didn't want to waste time. But someone started a thread on my site Metabunk, and numerous people contacted me directly to ask what I thought. I told them it was a waste of time.

But thousands of people were interested, and even after the various initial debunks were discovered, I was still getting inquiries. So, I made a quick video explaining all the reasons the video was fake and published it on August 21, just two weeks after the initial kerfuffle.

In the meantime, the Redditors had grouped together, splitting off from the increasingly skeptical r/UFOs to their own fiefdom of r/AirlinerAbduction2014. A thought leader called Ashton Forbes, who began to post extensively on the topic on both Reddit and Twitter/X, emerged.

Forbes started out slow, just nit-picking the debunks, but he rapidly picked up steam and began to simultaneously collect evidence for teleportation while rejecting the mountains of evidence against it. He gained a lot of followers in a relatively short time and probably also set a record for the number of people he blocked in that time (I was one of the first to go).

He started appearing on podcasts—at first on some of the more credulous UFO channels but then podcasts a little more mainstream. Regardless of what happened on those podcasts, they only increased his followers.

On one particularly memorable appearance on the *Danny Jones Podcast* (with 743,000 followers on YouTube), Jones brought up the explosion matching the stock footage. "It's an exact match," he said. "No," replied Forbes, "it just looks similar; just because my butthole looks like your butthole, it doesn't mean we have the same butthole." A visibly stunned Jones ultimately concluded the videos were fake, but Forbes and his followers grew stronger from the exposure.

Things were hitting a peak in November 2023 when Forbes was endorsed on Twitter/X by Kim Dotcom, a conspiracy-minded millionaire with 1.5 million followers. In a long post, Dotcom lauded Forbes and described the videos as "the most significant leak of military technology in history" (Dotcom 2023).

This greatly boosted Forbes because most of Dotcom's followers were amenable to such a theory. The post got

6.3 million views. This was followed by a video from the popular conspiracy channel "Anonymous Official." Then Dotcom offered a bounty of $100K for anyone who could provide the original footage.

Debunked Again

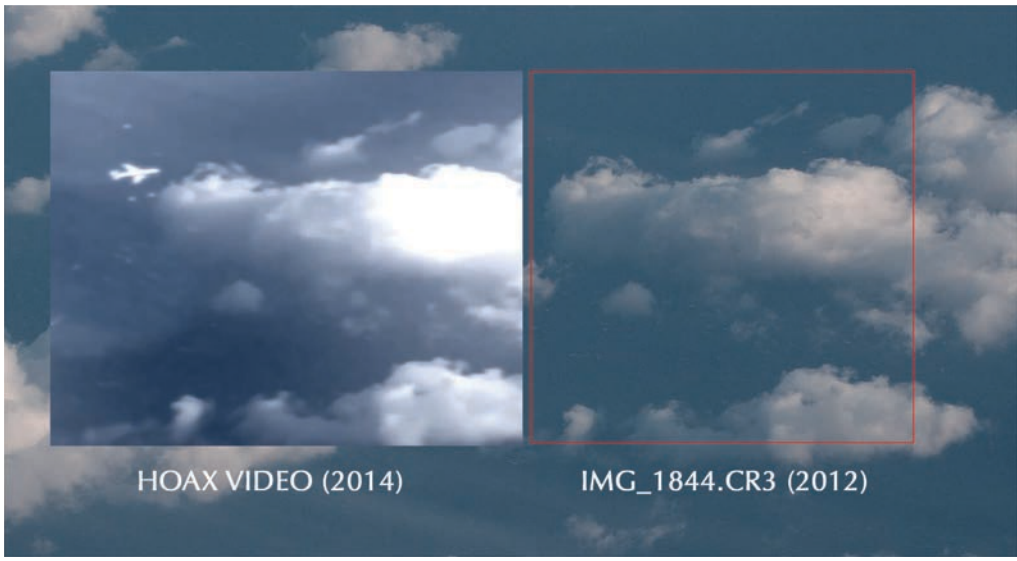
That got people's attention. Hundreds of people had already been looking into the origin of the video, and now they were incentivized. A few days after the reward was offered, an anonymous Redditor (going by the cryptic name of u/DI370DPX3709DDYB2I6L) announced he'd found the source of the clouds on a stock photo site called Textures.org.

Again, this was a source I was familiar with. I left the games industry a long time ago but still hang out on a private industry forum, where I know the owner of Textures.org. It specializes in assets for use in games. In this case, reference photos of clouds posted in 2012 were found that matched the fake video that was produced in 2014. Case closed!

Of course, Forbes and his followers were having none of it. Where, they asked, was the evidence that these textures even existed in 2012? They looked up the archived history of the site, but it only went back to 2016. Sure, the photos were *listed* as being in 2012, and when downloaded, the metadata *said* 2012, but could that all have been faked?

The site owner weighed in, checked the dates on the files, and said they were correct. He also said he knew and trusted the photographer. Then, the photographer, Jonas De Ro, came forward and supplied the raw original images from his archive. The super high-resolution images were a perfect match, with portions in every frame of the fake video.

De Ro's photos should have sealed the deal, like every step along the way should have sealed the deal. But questions were *still* raised. Was De Ro legitimate? Had he been hacked? Dotcom contacted him and was satisfied with the answers he got. Over the course of a few hours, Dotcom flip-flopped from accusing me of being a government agent to declaring the entire thing debunked and the videos fake. He messaged me to tell me I was correct. Of course, then people thought he had been compromised.



Finding the high resolution source images should have been the final nail in the coffin.

Take a step back and consider what was being proposed: The theory from Forbes was that the U.S. government had detected that a plane carrying important personnel, taking off from Malaysia, had a fire on board, so they quickly dispatched some advanced technology that used spinning orbs to teleport the plane to a safe location, filming it from a drone and two satellites. Unable to reveal the technology to the world, the passengers were put in witness protection. The footage from the satellite was used to make much higher-resolution images of clouds that were then hacked into a 2012 set on Textures.org and the hard drive of the photographer, just in case the footage was leaked, which it was. Then an army of debunkers was hired to discredit Forbes's theory to keep the secret safe.

This doesn't even explain the other issues with stock footage used for the explosion or numerous errors with the 3D rendering and compositing. But that doesn't matter. It's already ludicrously and insanely impossible and convoluted. But some people still believe, to this day, that the plane was teleported.

Why Bother?

So why bother? I didn't at first, but if we let things fester, they sometimes grow. This hoax wasn't worth addressing back in 2014 when it just had a few thousand views and most people thought it was a hoax.

But when it started to get millions of views, things changed. If it's not addressed, then many thousands of people who might be prone to things such as QAnon or believing the election was stolen will get sucked into believing this. And if they believe that the government can carry out and then cover up an event of this magnitude, then there's very little else they won't believe. Getting sucked into this via a harmless-seeming interest in UFOs could lead to getting sucked into far more dangerous rabbit holes.

So, I'm grateful for all the work people did in tracking down the original images and analyzing the many issues with the video. I wish I'd done a little more myself, but in the fight against disinformation, every little bit helps. ■

Note

Additional resources and original videos in the Metabunk thread can be found at https://www.metabunk.org/threads/mh370-hoax.13104/. Thanks to Textures.org for the stock images.

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[SKEPTICAL INQUIREE BENJAMIN RADFORD

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There Be Monsters! Is it True We've Only Explored 5 Percent of the Oceans?

Q: **We've only explored 5 percent of our great oceans and know more about deep space than what's here under our waters! Why is that?**

—S. Millman

A: This canard surfaces regularly in many mystery-mongering contexts, including television shows and articles. The question evokes images of wide swaths of *aquatic terra incognita*: huge blank spaces on maps under seas and oceans where we simply have no idea what's down there. Could it be Atlantis, extraterrestrial alien bases, or Godzilla? Maybe underground caves leading to a hollow earth populated by dinosaurs! *There be monsters!*

This particular question arose in a discussion about something called the "Baltic Sea Anomaly," allegedly "four meters thick and sixty meters wide. Sonar found drag marks on the object, meaning it was not formed naturally." This claim was breathlessly promoted by a team called Ocean-X and suggested to be an alien spacecraft in mystery-mongering press releases.

First, let's address this "anomaly." As NBC News reported, samples of the object were given to Volker Brüchert, an associate professor of geology at Stockholm University, for analysis. Brüchert poured cold water on the "unexplained" mystery:

> Turns out, neither he, nor any of the other experts contacted about the Baltic Sea object, think there is anything mysterious about it. "It's good to hear critical voices about this 'Baltic Sea mystery,'" Brüchert said. "What has been generously ignored by the Ocean-X team is that most of the samples they have brought up from the sea bottom are granites and gneisses and sandstones." These, he explains, are exactly what one would expect to see in a glacial basin, which is what the Baltic Sea is. (Wolchover 2012)

So, the "anomaly" that prompted the question turned out, unsurprisingly, not to be an anomaly at all but instead a classic example of a manufactured mystery.

But back to the original question: Is it true that we have only explored 5 percent of the oceans, and if so, why? Of course, the answer partly depends on what one means by *know about* or *explored*, but if it's true that in 2023 95 percent of the ocean floor is unknown, then the field of oceanography has some explaining to do.

As it turns out, we do, in fact, have a pretty good idea of what's down there—within practical limitations. As with our moon and other planets, we don't need to physically set foot on the ocean floor to know what's there. As the National Oceanic and Atmospheric Administration (NOAA) notes:

> Close to 70 percent of our planet is covered by water, and that water refracts, absorbs, and reflects light so well that it can only penetrate a few tens to hundreds of meters. To humans and most satellite eyes, the deep ocean is opaque. But there are ways to visualize what the planet looks like beneath that watery shroud. Sonar-based (sounding) instruments mounted on ships can distinguish the shape (bathymetry) of the seafloor. But such maps can only be made for places where ships and sonar pass frequently. The majority of such measurements have been made along the major shipping routes of the world, interspersed with results from scientific expeditions over the past two centuries. (NOAA 2020)

Most cargo and passenger ships follow well-established routes (for economic and practical reasons), so those areas are naturally better mapped than areas further afield. As a practical matter, there is little need or incentive to fully map the detailed features in the Atlantic Indian Basin, for example, between South Africa and Antarctica, or in the South Pacific. (For a fascinating interactive look at shipping routes, see www.shipmap.org.)

For more details, I reached out to David Sandwell at Scripps Institution of Oceanography. While scoffing at fanciful tales such as Atlantis, he acknowledged that there's a grain of truth to the claim: "One can say the seafloor is the most poorly charted area of the inner solar system." He explained that there are two basic approaches to mapping the deep seafloor. The first uses large research vessels equipped with

multibeam sonar, which can achieve 200–400-meter spatial resolution; about 20 percent of the deep ocean has been mapped this way. The second is using satellite altimeters to map the marine gravity field and in turn estimate bathymetry. It works like this: Because marine mountains have a lot of mass, they exert a gravitational pull on the water above and around them, allowing scientists to map and measure the ocean floor (conversely, less gravitational pull will read as absence of mass and reveal trenches and valleys).

The entire seafloor has been mapped, albeit not at high resolution. A quarter has been mapped by ships at about 200 meters horizontal resolution, and the remaining 75 percent is derived from bathymetry. The idea that 95 percent of the ocean floor is unknown is simply false.

Also, of course, asking what "we know" about the ocean depends on who *we* is. Sandwell noted that the U.S. Navy has over a century of ocean floor mapping data in its classified archives. Submarine warfare is a crucial arm of the military, and—as with satellite and other surveillance techniques and technology—the Pentagon has no interest in publicizing to enemy states the extent of its knowledge and mapping ability. According to Sandwell, "French, U.K., and many other governments have significant military holding. Release of these data could increase the seafloor mapping to perhaps more than half of global coverage." Just because you can't find detailed maps of the ocean floor in Google searches or popular science magazines doesn't mean they don't exist.

Reasons the ocean floor isn't more fully explored aren't hard to fathom. For one thing, oceanography receives far less funding than space exploration. Sandell noted that there is useful information to be gleaned from seafloor research, including better understanding of plate tectonics, past seafloor spreading, and deep ocean circulation. And how to avoid accidents; the *USS San Francisco* submarine crashed into an uncharted seamount in January 2005, killing one sailor, injuring 120 others, and badly damaging the vessel.

Detailed ocean floor mapping is both time consuming and expensive, and current resolution is adequate for most practical purposes. Unless there's a search for something specific, such as a missing ship (e.g., the *Titanic* or *Whydah*) or aircraft (e.g., flight MH 370), or deposits of exploitable resources such as oil, there's really no reason to create high-resolution maps outside of military or scientific applications. Even on land there are huge swaths of land that haven't been explored or mapped down to the foot, because there's little reason to do so. Vast tracts of Greenland, Canada, Russia, China, Australia, Algeria, and Brazil, for example, are remote areas on which few if any people have set foot. That doesn't mean the land is unknown, unknowable, or mysterious, just difficult to access. As with any branch of science, there remains much to learn about the ocean floor, but the basic outlines are pretty well understood. ■

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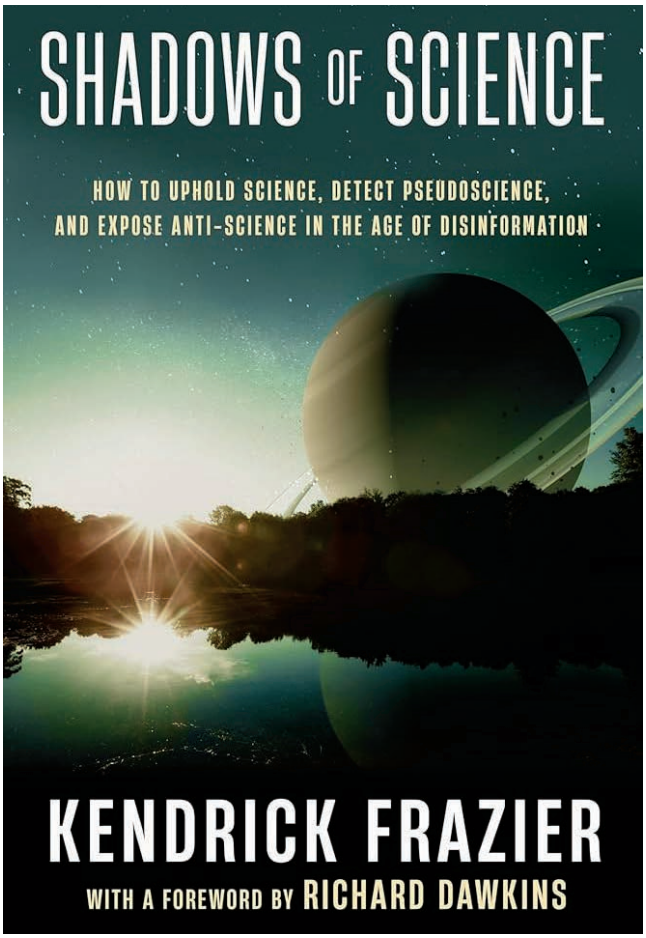
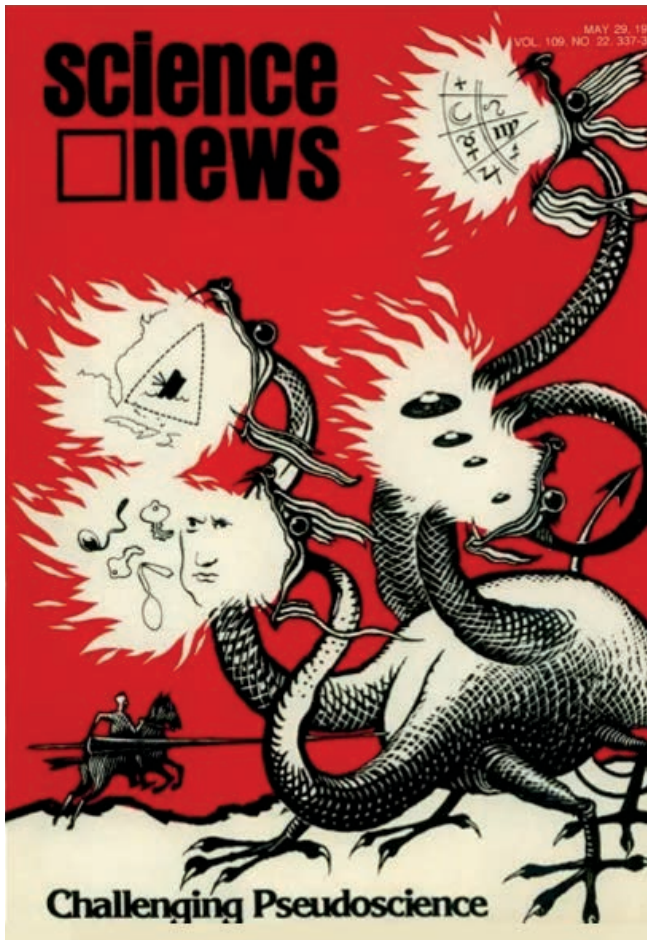
Stories That Should Be Handled with Care: The Subjects of Pseudoscience

KENDRICK FRAZIER


SHADOWS OF SCIENCE
HOW TO UPHOLD SCIENCE, DETECT PSEUDOSCIENCE, AND EXPOSE ANTI-SCIENCE IN THE AGE OF DISINFORMATION
KENDRICK FRAZIER
WITH A FOREWORD BY RICHARD DAWKINS



Cover of *Science News* magazine based on Ken's cover story—"Science and the Parascience Cults"—about the formation of CSICOP (May 29, 1976 issue).

Editor's Note: This article includes two excerpts from chapter 5 (titled "The Subjects of Pseudoscience") of Kenrick Frazier's fantastic new book Shadows of Science *(2024). The first excerpt is the beginning of the chapter, and the second excerpt is the last three paragraphs of the chapter. We are grateful to Ruth Frazier and Prometheus Books for granting reprint permission and to Ken for sharing this key part of his origin story (and the origin story of* Skeptical Inquirer*).*

When I joined the staff of *Science News* magazine in Washington early in my career as a science journalist, someone handed me a nicely printed sheet of hints on writing science. On the back of this sheet was a small-type, two-column section, "Stories That Should Be Handled with Care." It was written around 1950, or perhaps even earlier, by Watson Davis, then the director of Science Service and editor of what was then called *Science News Letter*. Davis was a pioneering science journalist. He and his predecessors and colleagues at Science Service and at several respected major newspapers and magazines had helped invent the profession of science journalism in the United States. (*Science News Letter* became *Science News* in March 1966. In 2006, Science Service became the Society for Science and the Public, now often shortened to Society for Science. In 2008, *Science News* moved from weekly to biweekly publication. Throughout 2021–2022, *Science News* and its publisher celebrated their one hundredth anniversary, a rare event in magazine publishing.)

The "Stories That Should Be Handled with Care" section began,

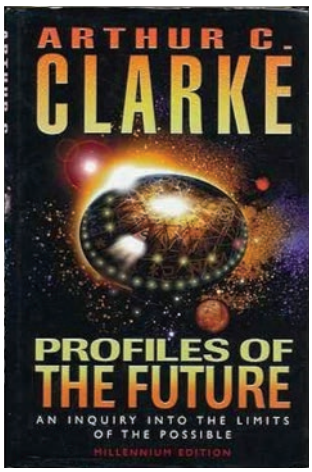
> Stories on this list should, in general, *not* be used, at least until they are thoroughly checked and investigated by several competent specialists in the subject. They are not forbidden stories, for some of the impossible things of today may become possible tomorrow, but scientific discoveries rarely come nowadays from accident or inspiration. They are usually the result of systematic research by many investigators.

The top of the list included "sweeping claims of any sort," rediscoveries of "lost arts," any "secret" scientific or technical process, and complaints by an inventor of a "conspiracy of silence."

It then listed, by category, specific topics to be handled with care. The first: "'Supernatural' Stuff." Here was included (among others) "telepathy and mind reading," "spirit manifestations of any sort," "astrologists and horoscopes," "end of the world predictions for the near future," "numerology," and "rediscoveries of lost prophetic books." Next came the "Medical" category. Included here were hypnotic "cures," any absolute cure of any disease, drugs for curing obesity and underweight, rejuvenation, electrical treatments for serious disorders, mineral waters as cures for diseases, and unauthenticated treatments of cancer, tuberculosis, colds, and diseases.

Under "Physics and Mechanics" came perpetual motion, machines that produce more energy than they use, fuel-less motors, rediscovery of such supposed lost arts as hardening of copper, "death rays," divining rods, and intuitive methods of discovering water, oil, and minerals. Under "Animal and Plant World" were listed creation of life, spontaneous generation of life, sea serpents, prehistoric and gigantic animals living today, inheritance of applied characters, and living "missing links." Concluding the list was a "Miscellaneous" section that included messages to or from Mars; skeletons or mummies of "giants" more than seven feet tall; squaring the circle; the moon's influence on weather, crops, or people; lost continents; discovery of ciphers in old books and manuscripts; and discovery of the secret of the pyramids, sphinx, or other ancient monuments.

Now, you can easily object to a list like this: "But, what about … ?" You can insert here your own example of some subject once thought impossible that may now not be. One of my favorite all-time books is Arthur C. Clarke's *Profiles of the Future: An Inquiry into the Limits of the Possible*. Clarke was one of my heroes, and I'm proud to own a personally inscribed copy. The introduction and first two chapters are brilliant cautionary tales about past failures of nerve and imagination by certain scientists who were trying to anticipate the future and were wrong. Some things were spectacularly wrong. (One quick example: In 1956, Britain's new Astronomer Royal, Richard van der Riet Woolley, told the press, "Space travel is utter bilge." Sputnik was launched into space the next year, and one year after that he was a leading member of the committee advising the British government on space research.) Scientists don't want to appear foolish like this. Most are loath to say that something is impossible—with the exception of when something violates the laws of physics, and even then, they might quibble. They usually prefer a word or phrase with a little more wiggle room, like *highly improbable*. (Again, note Davis's careful caveat that "some of the impossible things of today may become possible tomorrow.")



In fact, Watson Davis's list serves a valuable service. The list really does include many, if not most, of the subjects that have typically resulted in sensationalized claims that seldom stand up to scientific scrutiny. This list isn't arbitrary. It was created from top science editors' long experience with such stories and seeing how tabloids and other popular publications that care little for scientific accuracy or scientific responsibility mishandle them. These stories have endless fascination to nonscientist readers and to general writers who know nothing about science. But over and over and over again, titillating stories about such matters have turned out to be wrong. Avoiding them or handling them with great care really does keep science writers who share the values of responsible science out of morasses of mistaken science that other writers fall into so often.

Whether they've heard of this particular document or not, all good science writers and editors have some sort of such a list in their heads. It may be judgmental, yes, but just as scientists must make judgments continually about what is most likely to be good and useful and fruitful science (as I've mentioned), those who write about science for the public must do the same. As long as such lists are taken seriously and thoughtfully but not dogmatically (note Watson Davis's qualifiers in his first paragraph), they are extremely useful.

I first described this list in August 1977 at the first meeting of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) at the old Biltmore Hotel in New York City. As editor of *Science News*, I had been invited to give a science editor's perspective on examining paranormal and fringe-science claims. Eighty-eight stories are listed on that sheet. When I spoke, the list was already well over a quarter-century old. "Looking over that list now," I said at the time, "I can find only one ('determining or controlling of sex before birth') that could be said definitely to have moved out of that category ['stories that should be handled with care'] and into the field of legitimate science, and that's only in the last few years."

Now, more than four decades have passed. The list, now more than seventy years old, still stands up well. That's amazing when you think about it. Note that it was written before the semiconductor revolution; before the structure of DNA was known; before lasers, copying machines, cell phones, the internet, and social media; and before any object or person had been rocketed into orbit or landed on the Moon, Mars, or

Venus. All sciences have made enormous strides, yet I would judge that only two other items on that list have *possibly* now moved into the realm of legitimate science.

"Long-range weather forecasts in general" is perhaps one. Weather forecasting has improved dramatically since the mid-twentieth century, and now three-, five-, and seven-day forecasts to some degree of accuracy are possible. Ten-day and thirty-day outlooks are made but are very general. But whether you consider any of these long-range forecasting or not is another matter. (Climate prediction, which does look at very long-term trends, is not at all the same as forecasting day-to-day weather.) "Death rays" (high-powered lasers?) is *possibly* another. Yet even here, the cautionary caveats are still worth remembering. Handle with care.

That precautionary list of stories to handle with care certainly helped shape my attitude toward such claims. Again, they aren't forbidden topics; they are just subjects where, experience shows, scientific inquiry usually leads to dead ends and where, in news organizations not well versed in scientific understanding, sensationalism often prevails over good science.

I think it may be useful to prepare our own new list of such topics and to organize them by the sciences they shadow—or at least by the sciences they share some subject content with. They are topics that people often accept uncritically and in which unscientific or pseudoscientific thinking is prevalent. One essential point I must strongly emphasize: They *can* be examined responsibly and scientifically by people who use the tools of scientific skepticism. But too often, the opposite occurs. These topics have such a strong emotional appeal that followers quickly become fans or advocates. They come to believe, often very earnestly, that the claims associated with them are, in some sense, scientifically true. At some level, their followers seem honestly to think that their pet topics are legitimate scientific advances or even whole new sciences—even if they happen to notice that most scientists seem not to share their enthusiasm.

Here, then, is my attempt to organize representative pseudosciences—or topics that typically attract pseudoscientific thinking—by the scientific fields they "shadow":

Archaeology and Earth Sciences: ancient astronauts, ancient inscriptions, the Bermuda Triangle, dinosaur and human footprints together, dinosaurs contemporary with humans, dragon hoaxes, fire-breathing dinosaurs, global flooding in human history, a hollow Earth, lost ancient technologies, lost continents (Atlantis), psychic archaeology, psychic earthquake predictions, undersea "pavements," unverified early visitations to the New World

Astronomy and Space Sciences: alien abductions, alien artifacts, alien visitations, astrology, big bang rejection, cities on the Moon, crashed saucers, an electric universe, end-of-the-world apocalypses, a face on Mars, full-Moon effects, Moon-landing denial, neoastrology ("Mars effect"), recovered saucers, rogue planets, UFOs, Velikovskyian "Worlds in Collision"

Biology and Anthropology: anti-evolutionism, birth-date-based biorhythms, bogus fossils (the Piltdown man), cattle mutilations, chupacabras, creationism, cryptozoology or undiscovered large animals (bigfoot, yeti, Loch Ness monster, or lake monsters, etc.), intelligent design

Cognitive Science and Neuroscience: mind-body dualism, near-death experiences, out-of-body experiences, pop psychologies about the brain, seeing Heaven, split-brain exaggerations, visiting Heaven

Medical Sciences (Pseudomedicine): acupuncture, alternative medicine, anthroposophic medicine, antiaging creams, applied kinesiology, aromatherapy, ayurvedic medicine, chelation therapy, chiropractic (other than for treating back pain), coffee enemas, colonics, complementary medicine, cleanses, crystal healing, cupping, detoxification, ear candling, electrodermal screening, energy healing, energy medicine, essential oils, fad diets, faith healing, feng shui, flower remedies, food supplements, herbal remedies, homeopathy, integrative medicine, iridology, jade eggs, magnet therapy, meridians, natural remedies, naturopathy, oil pulling, oxygen therapy, performance-enhancing bracelets, psychic surgery, quackery, quantum medicine, quantum quackery, reflexology, spontaneous human combustion, therapeutic touch, unproven medical remedies, weight-loss schemes

Physics and Chemistry: accelerators creating mini black holes, anthropic principle misinterpretations, antimatter pseudoscience, Bible codes, blood of Januarius, bomb-detector devices, cold fusion, dowsing, energy catalysis (e-cat), energy healing, faster-than-light travel, free energy, human-presence-detector rods, Kirlian photography, magnetic healing, misapplications of quantum mechanics to the macroworld, New Age physics, perpetual motion,

psychic photography, quantum mysticism, relativity denial, the shroud of Turin, water with memory, weeping statues, young-Earth creationism

Psychology: aura reading, bogus self-help schemes, Dianetics, divination, eye-movement desensitization and reprocessing (EMDR), facilitated communication, fringe psychotherapies, fortune-telling, ghosts, graphology, hauntings, hypnotic age regression, mass hysterias, mediums, multiple personalities, parapsychology, past lives, pop and fad psychologies, premonitions, psychic claims, psychic detectives, psychic powers (ESP, precognition, psychokinesis), psychics, rebirthing, recovered memories, reincarnation, repressed memories, remote viewing, Rorschach inkblot tests, Satanic-ritual-abuse rumors, spirits, thought-field therapy, transcendental meditation

Yes, that is quite a list! And yet it is not all-inclusive. Dozens—perhaps hundreds—of additional subjects could be listed just as well.

There is a fair amount of arbitrariness in these groupings. Many topics might just as well be classified under another scientific field, which is hardly surprising. These broad categories of science, although long accepted, are hardly self-contained. One science blends into another pretty much seamlessly. Much science today is interdisciplinary, and scientific insights from several fields are usually brought together in studying scientific ideas, so why wouldn't the same be true in the examination of pseudoscientific claims?

***

The topics of pseudoscience are legion. In this chapter, I provide a brief overview of some of the most prevalent and some ideas about how to organize them by the sciences they shadow. Some can also be seen as hoaxes, conspiracy theories, or denialisms. Most retain popularity (despite remaining unproven) for long periods of time; a half-century or more is typical. But some change their names or outer guises regularly to seem new and different.

I caution again: All these topics *can* be examined responsibly using the tools of scientific and critical thinking. My colleagues who investigate and study them from a scientific perspective do that all the time. But experience shows that these topics tend to evoke enthusiasms and yearnings well out of proportion to their empirical validity (or lack thereof). As a result, they should raise—and *do* raise—cautionary red flags for everyone concerned about what is real. It is precisely because they have such ready appeal and such emotional power that we must guard against our own and others' wishful thinking—and still always consider them "stories that should be handled with care."

Yet this chapter is mainly a look at the skeletal structure of pseudoscience, essentially its gross anatomy. For what really makes something a pseudoscience, we must look deeper—into its functioning and dynamics, its working physiology. We need to look at what makes for pseudoscientific thinking and how that thinking contrasts with scientific thinking. That I explore in the next chapter. ■

Kendrick Frazier was the editor of Skeptical Inquirer for nearly forty-five years until his death in November 2022.

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Prophet of Oppenheimer's Atomic Bomb

BRETT TAYLOR

Did a hillbilly prophet foretell the development of the atomic bomb?

John Hendrix lived twenty miles from Knoxville, Tennessee, and the nearest established communities were Scarboro and Robertsville, both of which were small. He did not become a prophet until he was nearly fifty years old, at the turn of the twentieth century, when he spent his time on "communion in the deep woods" and then returned to report on what he had learned.

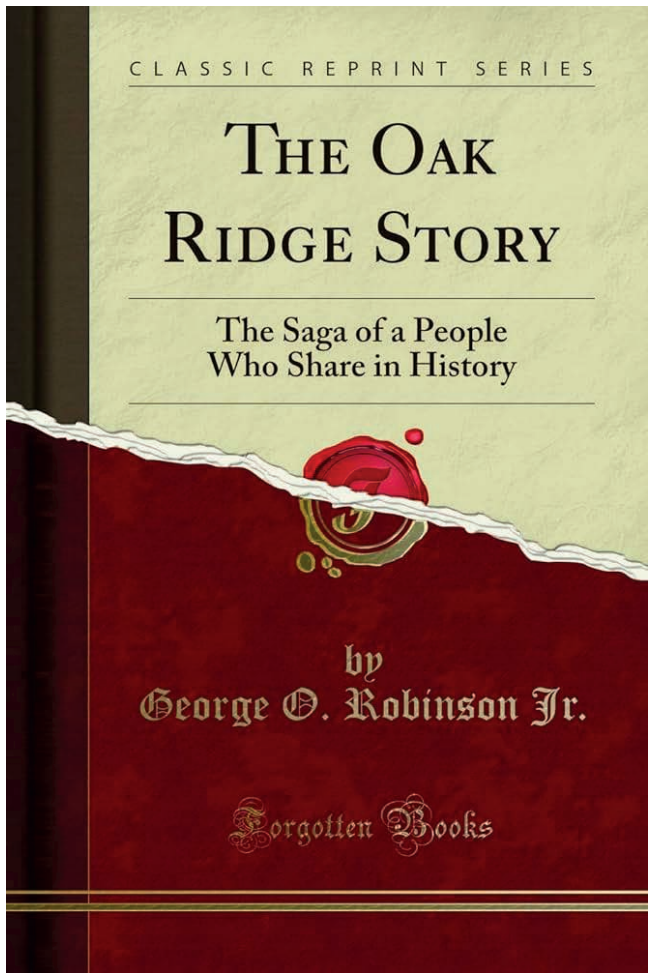
As the story is usually told, Hendrix first told his wife that a railroad would expand from Knoxville through Central Anderson County. And indeed, "the Louisville and Nashville Railroad within a few years began construction of a new line along the approximate route spelled out by Hendrix" (Robinson 1950, 18). His next major vision came as he lay on the ground, looking at the sky. A voice instructed Hendrix to sleep on the ground for forty nights.

> "I tell you," he said, "Bear Creek Valley some day will be filled with great buildings and factories and they will help toward winning the greatest war that ever will be. And there will be a city on Black Oak Ridge. The center of authority will be on a spot which is middleway between Sevier Tadlock's farm and Joe Pyatt's place. A railroad spur will branch off the main L&N line and run toward Robertsville and then it will branch off and turn toward Scarboro. It will serve the great city I saw in my vision. Big engines will dig ditches and thousands of people will be running to and fro. They will be building things and there will be great noise and confusion and the earth will shake…" Hendrix would mutter, "I've seen it, it's coming." (Robinson 1950, 18–19)

George Robinson's account, published in 1950, codified the story as it is usually told today. I first learned the story from an educational filmstrip in the sixth grade. The slideshow featured an image of an elderly hillbilly type, with the requisite flowing white beard. There don't seem to be any photographs of Hendrix, so this was likely a generic photo of an Appalachian man. An actor's voice embodied a hillbilly prophet, proclaiming that his humble rural neighborhood would be the site of a great city. My memory, faded as it is, suggests that the wording came straight from Robinson's book. Showing a psychic testimonial to a group of grade schoolers in an educational setting amounted to an official endorsement of soothsaying to impressionable kids like us.

The earliest version of the story that can be located today comes from an earlier newspaper article by Sgt. Richard B. Gehman, associate editor of *The Oak Ridge Journal*. Established in 1944, it was the first newspaper to be published in the newly established city of Oak Ridge, which was more a government works than an actual city at this point. I am referring of course to the Manhattan Project, a massive effort established for the sole purpose of building Oppenheimer's new superweapon to be used against Japan.

Sergeant Abe Levitt suggested Gehman speak to Lieutenant


CLASSIC REPRINT SERIES
THE OAK RIDGE STORY
The Saga of a People Who Share in History
by George O. Robinson Jr.
Forgotten Books

James W. Braden, the keeper of the Hendrix story, who was working in the Guard Force. Braden was the only one who seemed to know "the whole tale." He was obviously fond of telling it, because when Gehman found him in the main guard headquarters, he was telling that very story.

As Braden told, "Well, his wife decided he was crazy an' she had him put up. They put him in the asylum, but he tore out … He went home to his farm and he got eight rocks and put them in a row in his front yard. He said the Lord had told him to put them there to smite his enemies" (Gehman 1944, 3). It seems his act was persuasive, because commissioners came from the asylum to get him but decided against it.

Hendrix was shucking hay in the Edgemoor area when he became parched and saw a vision of the surveying of the L&N Railroad. He said that the Southern Railroad would survey the land first, but that the L&N would beat them to it. According to

Thursday, November 2, 1944 THE OAK RIDGE JOURNAL Page 3

LEFT: John Malone points out the grave of John Hendrix to Sgt. Abe Lavitt. ABOVE: Part of the farm on which the prophet lived. RIGHT: The porch of Hendrix's farmhouse, on which he would sit and study the scriptures, perhaps in this same rocking chair. (Journal Photos by Westcott.)

JOHN HENDRIX, PROPHET OF OAK RIDGE, PREDICTED PROJECT AND RAILROAD MORE THAN 40 YEARS AGO

Braden, the L&N did indeed begin their survey about eighteen months after Hendrix died, which would have been February 1917.

Gehman did his best to give the late prophet a mighty buildup. He had to; as he acknowledged, there was "no written proof" of any of the legend. He begins with a comparison to sixteen Old Testament Hebrew prophets, including Elijah and Daniel, followed by later diviners: "Greek oracles, medieval philosophers, Victorian mystics," Nostradamus, and Joseph Smith (Gehman 1944, 3).

Gehman was possibly not the first reporter to refer to the Hendrix story in a newspaper. Bert Vincent, whose homespun columns were a popular feature of *The Knoxville News-Sentinel*, was supposedly the first journalist to mention Hendrix in print. According to Gehman, Vincent "touched vaguely on the story in a Knoxville newspaper," in a column later reprinted in *The Clinton Courier*. Curiously, no one has ever been able to find Vincent's original version of the story.

In any case, Vincent returned to the tale in 1946. Waiting for a bus at the Clinton courthouse, Vincent spied John Raby, a man with the "most unusual mustache" he'd ever seen. As it turned out, this man had grown up in the Edgemoor community with John Hendrix: "Oh yes," he said. "I knew John Hendrix. He prophesied many things. One time he had a vision, and he said he went to Heaven … and he said up there angels drove the cows in every evening and milked them" (Vincent 1946, 21).

Vincent said that the courthouse "idlers" in Clinton laughed at Hendrix even after some of his visions came true and "said the old fellow just happened to hit it once, that he was still a crackpot, a screwball." Both John Raby and Clay Seals remembered Hendrix as more of a colorful oddball than the booming prophet of Gehman and Robinson's official stories.

Two months before he died, Hendrix claimed to be taken up to "Paradise … on a white ship 200 feet long." This was when he received his most important revelation: the valley where he came from would be the site of a big city called Black Oak Ridge and Bear Creek Valley would be home to buildings that would help make some kind of product that would "help win the worst war mankind had ever been suffered to" (Vincent 1970, 200).

In considering John Hendrix, it might be useful to remember that the entire tale would likely have been forgotten outside the Hendrix family if not for *The Oak Ridge Journal*, a publication established as propaganda for a government project. Ed Westcott, the official (and only) photographer of the Manhattan Project, later told a confusing version of how the story came about. He said that "Dick" Gehman discovered the Hendrix tale in "mid-1944," but "the lid was placed on Dick's story because intelligence wanted to prevent any attention to be attracted to the concentration of industry in Oak Ridge. However, a story featuring John Hendrix, written by Joe Oakes, was eventually published in *The Oak Ridge Journal* on November, 1944" (Smith 2006a). It makes little sense for the *Journal* to shut down the story only to republish it a few months later. Perhaps they felt dubious about running a local folk tale in a government publication (Smith 2006b). In what seems like an inside joke, Gehman was billed in his byline as "Joe Oakes," supposedly the *Journal*'s "prophecy expert." That's "J. Oakes" for short.

The most elaborate literary defense of Hendrix comes in a pamphlet by Oak Ridge resident Myra Mansfield. Mansfield attempts to rescue Hendrix from his screwball reputation by linking him to the holiness movement in protestant evangelism and therefore with the prophets of the Bible. The book includes an impressive list of eleven notable people supposedly related to Hendrix, including Sir Isaac Newton, President Woodrow Wilson, movie star William Holden, authors Robert Penn Warren and Elizabeth Browning, gangster Pretty Boy Floyd, and even Helen Keller (Mansfield 2013).

Mansfield and her husband, Jack, in addition to running their own church are the keepers of The John Hendrix Memorial Prayer Walk, a half-mile nature trail consisting of the little of the Hendrix farm that wasn't swallowed up by the Hendrix Creek subdivision. The park runs on whatever donations the Mansfields can get, and it doesn't seem to be much visited. When I walked it, I walked right in front of a doe that stared at me in confusion, clearly not used to seeing visitors.

Trail markers emphasize the late prophet's devotion to God.

The whippin' given nine-year-old James Braden is watered down to a more acceptable "spankin'." Trail Marker number 8 concludes by calling on us to accept the word of God.

In recent years, the story still occasionally pops up in the service of telling the government-approved version of the story. *The Secret City: The Oak Ridge Story: The Early Years* aired on PBS in May 2015. The documentary, financed with the help of the Y-12 uranium enrichment facility, begins with yet another telling of Robinson's version of the story, with actor Bruce Born reading the part of John Hendrix.

Whatever credibility the Hendrix story has rests on details of the location of the city and the railroad. The idea of Hendrix revealing exact details comes from close friends and family members who told the story years after Hendrix died. Given the tendency to misremember details, we can imagine these people embroidering Hendrix's visions with specific details. This would certainly be a comfort to any members of the Hendrix family, related as they were to a man who'd been laughingly dismissed as a crackpot and even institutionalized for a brief time.

Even though Bert Vincent tried to be neutral on what he called "a bizarre story," he pointed out a couple of discrepancies between prophecy and truth. His witnesses indicated that Hendrix's great city would be called "Black Oak Ridge," as indeed the area was *already* called. Vincent noted: "He missed there just a little. The city is Oak Ridge." He was even further off if we accept the story of Faye Childs, a granddaughter from John's second marriage. It was Childs who pointed out to Vincent that one of Hendrix's specific prophecies hadn't come true: "He missed the name of the city on Black Oak Ridge because he said it would be named 'Paradise.'" As for the railroad, "he said the depot would be at Scarboro. He missed on that. No depot ever was built at Scarboro."

Even when Vincent gave Hendrix some credit, the credibility is rather tenuous: Referring to Hendrix's white airship, Vincent notes, "Mind you, there were no airplanes then" (Vincent 1970). In fact, the years of 1896–1897 were host to a wave of mysterious airship sightings. If we accept at face value Gehman's placement of Hendrix's visions in 1904, then his own airship sighting was not especially unique and may have actually been a few years behind the times (Clark 2009).

Clay Seals, a man who claimed to be in the room when Hendrix died, was not perfect when it came to the facts. Smith notes that Seals's estimation of Hendrix's age at the time of his death was off by up to eleven years (Smith 2006b).

Hendrix died in 1915, but Vincent places his death a full twelve years earlier. The "buxom" wife, initially "indifferent" to visions of the future, who had her husband institutionalized, was his second wife. But the accounts that were eventually told to reporters came from men who were young when Hendrix was old, and Braden said that Hendrix became "very religious" as he aged.

The stories indicate that Hendrix's visions began with this conversion to religion in middle age. It sounds as if they began after the breakup of his first marriage to the former Julia Ann Griffith, who eventually abandoned John, holding him responsible for the death of their two-year-old-daughter, Ethel, who had diphtheria. Hendrix apparently felt the need to administer a spanking to a critically ill toddler. Mansfield attributes the girl's ensuing death to "coincidence," claiming the child only incidentally became ill immediately after the spanking. In any case, Julia Ann took the four remaining kids and left for Arkansas, leaving a note announcing her divorce from her husband (Mansfield 2013, 17–18).

Hendrix's reclusiveness and subsequent religious conversion sound like symptoms of a mental breakdown, not surprising in a man who'd lost his wife and five kids in one fell swoop. It's no wonder the locals thought him insane. But should we take his visions more seriously today? Not really. Predictions of war are nothing new. The specific wording in Robinson's account to the effect that a "great city" on the Black Oak Ridge would assist in "the greatest war that ever will be" sounds like an after-the-fact attempt to shore up credibility, as do the details of specific geographic elements.

In his day, John Hendrix was considered an unstable eccentric, a "screwball" in Bert Vincent's words. His life has been used to give color to the Oak Ridge story. But, given that the Hendrix legend was only set down decades later, it shouldn't be taken as proof of prophecy. Elevating an eccentric to a prophet based on scanty anecdotes does no great service to local history, and this story is best considered as a bit of quirky folklore. ■

Note

Ray Smith's articles on John Hendrix may be found at Smith's official website, Historically Speaking (www.smithdray1.net).

Acknowledgment

The author thanks Michael Stallo and The Oak Ridge Public Library for access to the copy of *The Oak Ridge Journal* pictured in this article.

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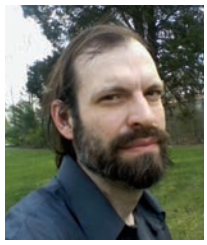

Brett Taylor was born at the Oak Ridge hospital, about two miles from the former Hendrix farm. He is the author of the poetry collection *Old Roads* from Jim Kacian's Red Moon Press.

Fitspiration, Pseudo-Healthcare Professions, and the First Amendment

KATIE SULETA AND EMILY HEMENDINGER

There have been a handful of recent court cases against people operating in healthcare despite dubious qualifications and defending themselves by asserting their right to free speech. The case of Heather Kokesch Del Castillo, who was a self-identified nutritionist and health coach in Florida, was rejected by the U.S. Supreme Court (Saunders 2022). Florida protects the title of *nutritionist* by requiring specific credentials, training, and background (NutritionEd 2020). Del Castillo was operating outside these requirements and attempted to assert that her freedom of speech allowed her to operate unqualified in this space. In Mississippi, health department officials have been slapped with a lawsuit asserting that they violated a woman's freedom of speech for asserting that she cannot operate as a dietician even though she isn't one (Ramseth 2020). These two cases are canaries in the coal mine, raptors testing the fences. The wellness industry is exploding and allowing several pseudo-healthcare professions to operate outside the bounds of regulated healthcare.

People have many reasons for seeking alternative medical treatment. For starters, they are displeased with the healthcare system, a sentiment exacerbated by the COVID-19 pandemic. And on a systemic level, the shortage of physicians (American Medical Association 2022) and mental health workers (Kaiser Family Foundation 2022) and the high cost of healthcare (American Medical Association 2023) are certainly not helping matters. But those reasons—personal and structural—are still not good enough to justify replacing the existing infrastructure with a different one.

Medicine, admittedly, had a shaky start. Before the scientific method was firmly established physicians were poorly trained (Barry 2019), and treatments were both scary and pseudoscientific (e.g., trepanning, bloodletting). But we're a long way from those days. Physicians, nurses, and other providers are highly regulated (Federation of State Medical Boards n.d.) and require standardized education and training. Of course, as in any field, some incompetent people get through (Caulfield 2021)—but because of this system, we are more likely to get someone good than not. That is, in fact, why the system exists.

Despite all the hard work from scientific development to education standards, people still complain of mistrusting trained providers. People turn to the internet to find a solu-

tion for their health problems instead of, or in addition to, seeing a regulated provider. Several different untrained, unregulated competing alternative professions have popped up in healthcare. Health coaches act as physicians prescribing specific action plans and even drugs (i.e., supplements) that are available over the counter and are unregulated (Office of Dietary Supplements n.d.). Life coaches are competing with licensed therapists (Aboujaoude 2020). Nutritionists compete with registered dieticians. Fitness influencers act as physical therapists and recommend supplements, often selling them too (NOW Foods n.d.).

Compounding the problem, the internet has made it very easy to dispense health advice by providing a platform for people to offer content, entertainment, and various viewpoints. As such, some become famous all in service to clicks, likes, shares, eyeballs, and advertising dollars. Background, education, and training often do not seem to matter when it comes to creating content. As a result, healthcare advice and views effortlessly slip into influencer platforms, and, for better or worse, it has an impact (O'Donnell et al. 2023).

The impact of social media on the health and wellness space is far-reaching. Consider content created in the name of *fitspiration* (*fitspo* for short) (Hemendinger 2023). Influencers tout titles of health coach or lifestyle guru (Green 2023). Research has shown that social media content encouraging "clean eating" (Ambwani et al. 2019) or dieting through pseudoscientific claims can lead to obsessive behavior around dietary patterns. These unfounded "wellness" posts can lead to weight cycling, yo-yo dieting (Marks et al. 2020), chronic stress, body dissatisfaction and a higher likelihood of muscular and thin-ideal internalization (Fatt et al. 2019). Due to lack of regulations, anyone with access to the internet can start preaching about celery diets used to cleanse the body of toxic metals or ways to heal one's inner child without ever having any training in dietetics or therapy (Wells 2019). Despite the danger in taking lifestyle and medical advice from someone with no training or experience, people continue to subscribe, follow, and like, further reinforcing the misguided idea that anyone can be an expert and leading even more influencers to flood the health and wellness alternative pseudo-healthcare professional market. Anyone can start their own social media account or website (Cowley et al. 2022) and start "consulting" as long as they fall under one of these alternative, unregulated professions. And the freedom of speech may cover this. Should it? Absolutely not. But depending upon the judge and the claim, it may. That's why these lawsuits are being filed: to see who is receptive to this argument.

Thankfully, some groups and consumers are holding these alternative professions responsible for misinformation (Leskin 2020), lack of results or follow through (Kekatos 2023), and harm their subscribers may have experienced. People operating these businesses will often hide behind the First Amendment. Social media is the wild west of health promotion and education, with very few rules and little regulation. Content creators often argue that they have the right to post whatever they want and if people want to know more, well they can just go ahead and fact-check it for themselves (Sung 2021).

Scrolling through the endless posts from these influencers makes it clear that guardrails are necessary around unregulated, alternative healthcare professions, especially on social media platforms. The freedom of speech is not absolute. Of course, there's the oft cited "You can't shout 'fire!' in a crowded movie theater" example, but in healthcare we can do even better than that. There's the case of the Diabetes Warrior in North Carolina ("Diabetic Blogger" 2012) who was diagnosed with type II diabetes. He then became a health and nutrition blogger, dispensing health and nutrition advice and meal plans. He was not a registered dietitian and received a cease and desist letter from the North Carolina Board of Dietitians, but his website and meal plans are still up. Then there's the Competitive Enterprise Institute (Minton 2012), who's tagline is "We fight for less regulation, more freedom, and fairness for all." One of the policy points they've argued is to remove licensing "barriers" that prevent doctors, nurses, and others from providing the care they're "trained" to provide (Young 2020). Even more recently, a family selling Miracle Mineral Solution attempted to hide behind the First Amendment protection of Freedom of Religion, which in this case is very closely tied with speech (Felton 2020). All these examples plus those of Del Castillo and Mississippi demonstrate that we have a problem of people operating in these pseudo-healthcare professional spaces, attempting to skirt regulation.

If you work in healthcare, you are signing up to provide the best care available for patients. Usually that is based on practice guidelines, which are based on evidence amassed by years of research. If places are not able to provide this level of care, they may not be reimbursed, their ratings may go down, their certifications can be stripped, and they may not even be allowed to provide care. Why are we allowing several new healthcare professions to gain popularity without holding them accountable for the bare minimum of training, credentialing, and foundations of practice? Holding these new professions up to even the slightest scrutinization reveals that they prioritize vibes and feelings over training, results, and science.

We've worked hard to advance our healthcare system by making it safer and more reliable and by implementing basic standards of care. This new crop of pseudo-healthcare professionals directly challenges the system we have worked long and hard to establish. They want to send us back to the times before specific educational and training requirements existed for providers. Would you want to go to a surgeon who simply *felt* they could perform surgery? The freedom of speech doesn't imbue the right to operate in any space a person wants to regardless of education and training. That's never been the case and shouldn't be now.

Now, imagine a world where these new professions work *with* healthcare providers to fill the healthcare gap by taking and providing referrals to appropriate levels of care, posting evidence-based information on their social media, providing community and peer supports for people who need more than a once-a-week therapy session, or even working with a general practitioner to directly provide nutritional and behavioral

health interventions for patients. Consider these examples of regulations for the new professions:

- A centralized organization to oversee each of these professions, such as the American Medical Association or for sub-specialties (i.e., those professions that could be seen as an extension of a regulated provider such as a life coach or health coach);
- Standardized requirements for licensing/credentialing and education with an organization responsible for disciplinary action in these areas, similar to The Federation of State Medical Boards;
- The development of practice guidelines establishing a standard of care by review of evidence-based practices and research.

This ideal world is possible—but only when these new professions are moved beyond self-regulation and when freedom of speech does not offer license to spread misinformation or claim expertise without relevant training and education. ■

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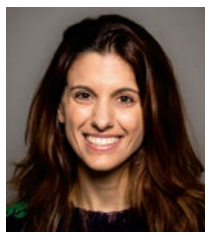

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Why You Will Never Know What 'Healthy Eating' Is

FRED P. ABRAMSON

Amazon lists 60,000 books under the search term *diet*. That many books on the same subject tells me that there is no accepted standard. Different books propose different styles of eating: "Avoid carbohydrates!" "Eat intermittently!" "Eat like a caveman!" "Increase foods that are antioxidants!" The list of recommendations is vast.

Assuming that "healthy eating" refers to a diet that will allow you to avoid disease and enhance your strength and vigor, your search is in vain. Why? Because accepting existing reports of healthy eating on a similar basis to other reports on health-promoting, or unhealthy behaviors, misses an important difference. To prove the effects of any one of the numerous published "healthy eating" proposals requires information that is not available.

Let's review how something is proved. In medicine, the gold standard is the controlled clinical trial. Here, two or more groups are stratified by some blind, randomized process into what seem like equally eligible participants. Each group gets a unique treatment: one may get one drug while one may get another or may get a placebo. When the populations are compared after a predetermined period of time, any difference between them *must* have been due to their specific treatment. There are no random events to confuse the conclusions.

To carry out such a trial for a dietary plan would require two components: At least two groups were randomly chosen, each of which followed a different food regimen. While this sounds simple, it is not feasible for very long. Only by using populations without free will, such as the military or prisoners, could a test diet be imposed. That brings up bioethical concerns. Free-living people are not likely to stay exactly on their mandated food program (Lichtenstein et al. 2021). For how long would the study have to be carried out? To answer that, one must know how long it takes for something unhealthy to show up; that is usually a long time, unless one diet contains something acutely toxic. Keep in mind that cigarette smoking—perhaps the single most serious deterrent to good health—takes ten to twenty years to show harm. So, consider "eating healthy" food plans. None have any ever been tested that long.

The most commonly discussed "healthy diet" is the "Mediterranean diet," which represents generations of people but contains no randomization. The United States Department of Agriculture used this diet concept in their eighth edition (2015–2020) of dietary recommendations (U.S. Department of Health and Human Services and U.S. Department of Agriculture 2015). The problem is that people who live around the Mediterranean are different in many ways from people who live elsewhere. Their genetics, lifestyle, health care, and too many other variables to list here are almost certainly different from populations that live elsewhere. How can one decide that from among all these differences that their diet is the *most* important aspect of their health status? Beyond that, their diets have changed enormously over the decades, so historical results may not be sustained. The Mediterranean diet is from an epidemiological study, not a controlled randomized trial. As such, it cannot be accepted as factual without many caveats.

Epidemiology is the branch of medicine that deals with the incidence, distribution, and possible control of diseases and other factors relating to health. A recent example of how useful epidemiology can be occurred during the COVID-19 pandemic (Anderez et al. 2020). From information such as

Red meat, butter
White rice, white bread, white pasta; potatoes, soda, and sweets
Use sparingly
Dairy or calcium supplement, 1-2 times/day
Multiple vitamins for most
Fish, poultry, eggs, 0–2 times/day
Nuts, legumes, 1–3 times/day
Alcohol in moderation (if appropriate)
Vegetables (in abundance)
Fruits, 2–3 times/day
Plant oils (olive, canola, soy, corn, sunflower, peanut, and other vegetable oils)
Whole grain foods (at most meals)
Daily exercise and weight control

infection rate, contact frequency, and prevalence of coexisting conditions, the spread of the disease was accurately predicted. No information related to the Mediterranean diet exists. All epidemiological studies include questions such as: Have the results shown a cause-effect relationship?

Showing that an exposure is strongly associated with a disease does not necessarily imply that there is a cause-effect relationship. What is the strength of association? Is there a temporal relationship between exposure and outcome? Is there a dose-response relationship, consistency, and biological plausibility (Zaccai 2004)?

While probably hundreds of properly randomized clinical trials (RCTs) of food regimens have been carried out, their limitation is they last only from weeks to months—much shorter than the time needed for most diseases to appear. Such studies examine targeted parameters of health, such as markers of inflammation, lipid levels, and blood sugar, but diseases are not seen in this short time.

Lichtenstein (2021) comments:

> In some human nutrition RCTs, "hard endpoints" or disease outcomes, such as incident events (e.g., stroke, myocardial infarction) or disease status (e.g., carotid artery thickness, arterial calcium score) are prespecified. Human nutrition RCTs are less likely to use hard clinical outcomes than in other types of studies because, in addition to the long lead times for natural disease progression, there are other challenges, such as sustaining adherence to a dietary modification (avoiding recidivism). Hence, long-term human nutrition studies are most often observational in nature.

Equally important, it is rare for trial reports to follow up on whether any weight lost in the trial was maintained when the participants left the trial or what their future health was like. It is generally noted that few people maintain trial-related effects when they are again eating without restraints.

Indeed, there are some known diet-health relationships. For diabetes, control of blood sugar through restrictions in carbohydrates is critical. For some hypertensives, salt restriction is important. But, for most diseases, diet and the condition have no short-term relationship.

I posit that the diet-health linkage we see today is a reflection of the diet-health linkage from long ago. It is critical to recognize that diseases such as rickets, scurvy, goiter, and certain anemias are deficiency diseases that can be prevented by dietary improvements. Centuries ago, our food supply was not as abundant or complete as it has become starting in the twentieth century. Perhaps our recollections of these deficiency diseases keep the vitamin shelves in our pharmacies loaded with a dizzying variety of products. However, unless one is eating a diet with insufficient variety to provide all the vitamins and minerals our body requires, multivitamin supplements are not needed (NHS n.d.). But this historical mindset may be why so many of us believe in the idea of "healthy eating." Ergo, the 60,000 diet books.

To clarify, I want to differentiate the terms *diet* and *food regimen*. We associate dieting with weight loss. Nutrition is much more concerned with our health than with our weight. A food regimen is a set of meals not necessarily designed to help us lose weight but to maintain our health by giving us all the nutrients in the right proportions. That should be everyone's goal.

It is very likely that "healthy eating" is no more complex than keeping a healthy weight. But we know that is not easy! If you want to "eat healthy," have a balanced diet, and don't fill your plate so full. It is less *what* you eat but how much! ■

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Fred P. Abramson, PhD, retired as emeritus professor of pharmacology at The George Washington University School of Medicine and Health Sciences in Washington, D.C., after thirty-one years on the faculty.

FUN & GAMES

Edited by Stephen Hupp

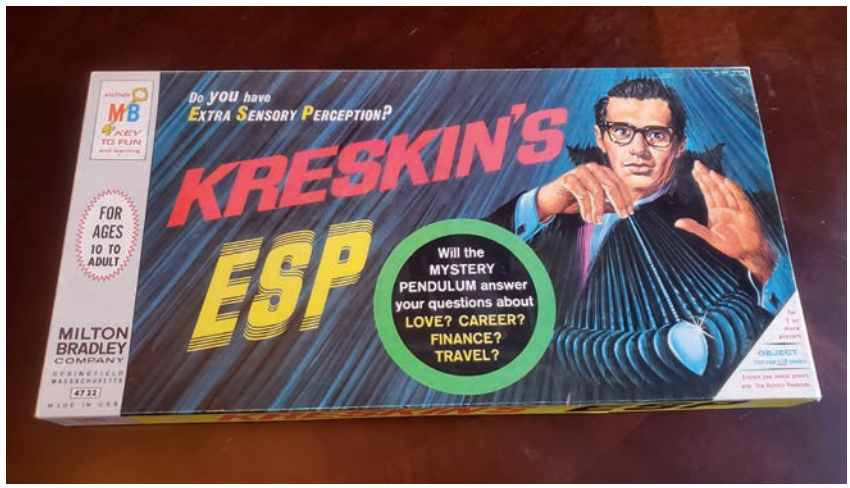
Find 3 groups of 3 connections...

RIDDLER	KENT	PANTHER
BAT	PENGUIN	PRINCE
PARKER	SPIDER	JOKER

Connectivity

These words can be divided into three categories, each with three words. They are all connected by a single theme. Can you discover all three categories and identify the theme? Your brain is great at finding patterns—sometimes this helps, but other times it hurts!

You can find answers to these games in the Secrets Revealed section (p. 66).


Do you have
Extra Sensory Perception?
KRESKIN'S
ESP
Will the MYSTERY PENDULUM answer your questions about LOVE? CAREER? FINANCE? TRAVEL?
FOR AGES 10 TO ADULT
MILTON BRADLEY COMPANY

Antique Mallarkey

Acquired from an antique mall in Traverse City, Michigan, Kreskin's ESP game (copyright 1967) asks, "Do you have this supernatural power?" The answer: "Kreskin, the world's foremost authority on ESP, thinks you do. You need only to develop it." With this test kit, you can "explore your mental powers with The Mystery Pendulum" (or at the very least you can get a live demonstration of the ideomotor effect). The pendulum answers yes-or-no questions about love, career, finance, and travel. You can also test your abilities with a set of cards depicting images of a heart, four dots, an up-arrow, a triangle, or a checkmark (based loosely on Zener cards, no doubt).

Penn Jillette played this game during his youth, and in his latest CSICon interview (described earlier in this issue of SI), he stated he fully believed that ESP was a scientific phenomenon. Why? Perhaps because the instructions say that "KRESKIN'S ESP game will give you the opportunity to reveal your ESP powers and explore the outer frontiers of the human mind in two scientifically proven ways." When Penn realized these techniques were deceptive, he suddenly disdained both magic and science, leading him down a path toward a career in juggling instead of magic (or science). During the CSICon interview, he credits both Teller and James "The Amazing" Randi with teaching him that magic can be done in an honest way.

Hoop Snake Discovery | Million Dollar ET Search | Poe Murder Mystery | Brain Training | The Silent Chamber of Insanity
Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON
Vol. 48, No. 1 | January/February 2024
BIGFOOT IS DEAD
RIP
1958-2023
$5.99 CAN/US

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THE MAGAZINE FOR SCIENCE AND REASON
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BIGFOOT IS DEAD
Farewell
1959-2023
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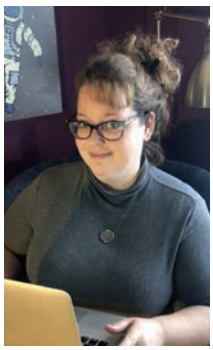
Investigate the Differences

Can you find sixteen differences between these two versions of the January/February 2024 Skeptical Inquirer cover?



Note: Both versions of this cover were designed by Celestia Ward, an academic editor turned cartoonist who runs Two Heads Studios in Las Vegas, Nevada. She has lent her pen to a wide variety of skeptical publications, both in comic and text form. She is also the content producer and cohost of *Squaring the Strange*, a weekly podcast that examines mysterious and mundane topics through a skeptical lens.

1	2	3	4
2			
3			
4			

Skepticross

ACROSS

1. What stories should be handled with
2. A good type of mind
3. Hucksters do it to you by your nose
4. On Medusa's head, perhaps

DOWN

1. Product that started as snake oil
2. If real, Bigfoot's family, with great
3. What Death does with a scythe
4. Justifies the means for a huckster

Healthy Skepticism about Wellness Culture

William M. London

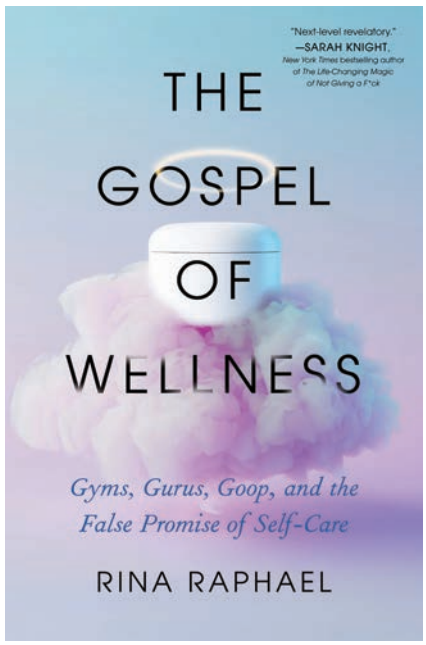
The Gospel of Wellness is the book I most strongly recommend to those who are invested in making themselves as healthy as possible through trendy products, practices, or services. It offers healthy skepticism, investigative reporting, fascinating insights, and the empathy of an author whose life became consumed by the enormous wellness industry, which consists of anything marketed to those "in active pursuit of well-being outside of the realm of medicine" (4). The industry's offerings promise to make people well in the physical, mental, social, and spiritual domains.

Rina Raphael is an accomplished journalist whose initial reporting on the wellness industry focused on lifestyle and business coverage but later expanded to science reporting emphasizing the importance of evidence to back up claims. She separates the wheat from the chaff and explains the challenge of sorting out causation versus correlation regarding medical advice. She shares insights from trustworthy experts.

Her popular wellness industry newsletter on Substack, *Well to Do*, is engaging and informative. It covers topics of interest to consumers and wellness industry insiders.

Raphael did an outstanding job as narrator of the audiobook version of *The Gospel of Wellness*. She sounds credible, relatable, and genuinely nice—as she was during her terrific presentation at CSICon 2023 and as a guest on the *Point of Inquiry* podcast in conversation with *Free Inquiry* Editor Paul Fidalgo on October 27, 2022 (see https://pointofinquiry.org/2022/10/broken-promises-and-false-prophets-rina-raphael-on-the-business-of-wellness/).

The hardcover version of the book offers endnotes but unfortunately no index. Index headings could have included everything from adrenal fatigue and alternative medicine to Whole Foods and yoga. It deserved a good one considering the fascinating range of topics it addresses so well. An index could have also included the various predecessors of contemporary wellness gurus sprinkled throughout the book in interesting historical flashbacks. And how about *health buzzword bingo* as an index heading? It's Raphael's term for what wellness-conscious celebrities say their lifestyles include. I think *manifestation*, which involves "co-creating" with the universe, would belong there. I see it as a winning term to have on one's health buzzword bingo card.



The Gospel of Wellness: Gyms, Gurus, Goop, and the False Promise of Self-Care. By Rina Raphael. New York, NY: Henry Holt and Company, 2022, 345 pp. Hardcover, $28.99.

Consumers invest considerable time, effort, and money in wellness culture because it has appealing features. Raphael discusses wellness culture's appeal to women specifically, suggesting it can meet their needs in ways that women's healthcare falls short. She notes deficiencies in women's health care, such as doctors who don't take their symptoms seriously. She examines how pursuing wellness through various industry offerings can offer women social support, respites from their career pressures, a sense of belonging, exclusivity, inspiration, and entertainment. I was fascinated by Raphael's discussion of attendees at a Goop conference who don't take Gwyneth Paltrow's ideas seriously but find the proceedings entertaining.

Raphael notes how wellness culture offers opportunities for stress relief, but some offerings come with excessive pressure on women to perform high-intensity workouts and achieve perfection. It can be self-defeating to embrace the message that you can always be more well.

The market for spirituality is huge. As interest in organized religion has been declining, Americans have been seeking spirituality outside of it. Thus, the wellness industry sells it, and, as Raphael explains, "The marketing of wellness has inspired a religious fervor—and not in a good way" (12). Wellness culture, as Raphael describes it, functions like religion. It includes classes conducted like religious revival meetings and quasi-liturgical platitudes. Its gyms function like churches. It tells you how you're supposed to live. It has false idols and even heretics.

Historian James C. Whorton made a similar comparison to religion in a book chapter about popular health reform movements in *Other Healers: Unorthodox Medicine in America* edited by Norman Gevitz. Also, religious studies scholar Alan Levinovitz discussed the religious thinking behind both "natural" and "wellness" in his 2020 book *Natural: How Faith in Nature's Goodness Leads to Harmful Fads, Unjust Laws, and Flawed Science*.

"Raphael notes how wellness culture offers opportunities for stress relief, but some offerings come with excessive pressure on women to perform high-intensity workouts and achieve perfection."

If Raphael is correct, we can expect segments of the wellness industry to continue to cater to the spiritual and religious inclinations that most Americans, especially women, have. "Atheism, in our overly optimistic society, feels too final," she declares. "Too negative. A real Debbie Downer. They want to believe in *something*." Atheists and secular humanists might have different ideas about being a Debbie Downer.

Raphael interviewed Don Ardell, who—perhaps unbeknownst to her—is a nonbeliever, promoter of healthy skepticism, and critic of religious superstition. Ardell is one of the architects of the modern wellness movement and author of the groundbreaking 1977 book *High Level Wellness*. Raphael notes that voices such as Ardell's get lost amid the noise. He told her: "Wellness was never meant as an advertising gimmick, a brand, a treatment, a market, industry, or service. Making a decision that you want to live a healthy life is not the same as being able to do it. If you don't have a supportive culture—friends, family members, and your environment … your chances are next to zero to be able to pull [it] off" (310–311).

In his March 11, 2020, *Real Wellness Report* e-newsletter, Ardell described the Center for Inquiry's emphasis on naturalistic philosophy, a cosmic outlook rooted in science, and a consequential ethical system as a "real wellness perspective on wonderfulness." ■

William M. London is editor of *Consumer Health Digest*, the free weekly e-newsletter of the Center for Inquiry's Quackwatch, and an emeritus professor in the Department of Public Health at Cal State LA.

A Foolproof Defense against Misinformation?

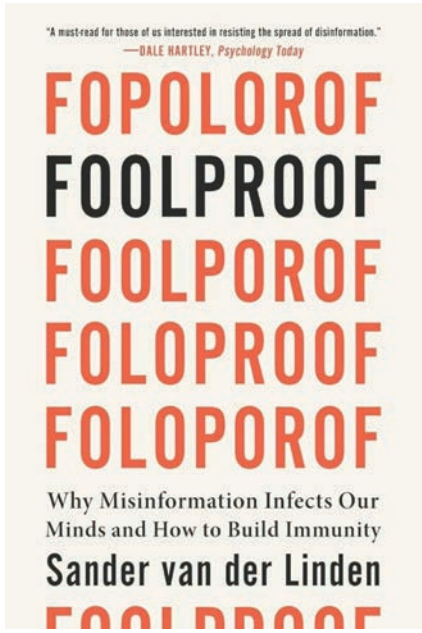
Terence Hines

Fake news and misinformation in the media—especially social media—is obviously a serious problem, not only in the United States but worldwide. But what to do about it? There have been numerous suggestions over the years, most advocating better education in some form or other. While better education would no doubt be helpful, it seems a bit of a cliched response.

In *Foolproof*, Sander van der Linden takes a more proactive approach to the problem. *Inoculation* is the key word in this approach. One way of forming a persuasive communication for a particular position is to start by describing the arguments put forth by those advocating the position you are arguing against and then refuting those points before going on to discuss evidence that supports the position you are arguing for. In social psychology literature, this is referred to as *inoculation*.

A basic concept in *Foolproof* is that misinformation can be thought of as a mental virus. From this, the concept of inoculating, or "prebunking," against the virus flows naturally. Prebunking is very similar to, but more elaborate than, the classical method of psychological inoculation. Bad News is the prebunking game that van der Linden and his associates and students have developed to combat the virus of fake news. The game is described as "a fully interactive fake news game that mimics a social media environment" (8). Players in the game learn the techniques that producers of fake news use by creating their own fake news headlines.

After a prologue, the book contains eleven chapters organized into three sections along with a short epilogue. Each chapter covers a particular topic related to the issue of misinformation or fake news and is organized around the idea of a specific behavioral antigen


"A must-read for those of us interested in resisting the spread of disinformation."
—DALE HARTLEY, Psychology Today
FOPOLOROF
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Why Misinformation Infects Our Minds and How to Build Immunity
Sander van der Linden

Foolproof: Why Misinformation Infects Our Minds and How to Build Immunity. By Sander van der Linden. New York, NY: W.W. Norton & Company, Inc., 2023. ISBN 978-0-393-88144-8. 358 pp. Hardcover, $30.00.

that can be used to combat fake news viruses. For example, chapter one, "Illusory Truth" in the section "Viruses of the Mind," discusses how the brain separates fact from fiction. Included are discussions of cognitive illusions, the brain's use of heuristics in decision making, the big lie technique, and top-down processing in cognition. The "antigen" for chapter one is to "make the truth more fluent." This means "making facts more accessible and relatable and repeating them more frequently." Van der Linden does realize that this is "not enough" (27). Other examples of antigens are "elicit accuracy-driven motivations" (chapter two), "avoid the echo chamber and don't feed the algorithm" (chapter six), and "identify and resist micro-targeting attempts" (chapter eight). The concept of a behavioral

antigen is an interesting one, but I wondered how these strategies could be implemented in the real world in a way to have any significant effect.

Chapter eight covers inoculation research from the mid-twentieth century. The chapter then describes laboratory studies by van der Linden and colleagues designed to see whether different kinds of inoculations could reduce the effects of bogus news stories following the interventions. There were two types of interventions: one simply involved providing a warning that a news story was bogus. The second was a "refutational preemption" that contained information regarding the bogus stories. Both interventions worked in the sense that they reduced the influence of the bogus story. The combined warning and refutational intervention worked best.

Chapter nine focuses on the six major types of manipulation used by the producers of fake news: discrediting, emotion, polarization, impersonation, conspiracy, and trolling. It is in this chapter that the idea of a fake news game first appears, in the form of a card game. But card games can't be used to reach large numbers of people. So Bad News was reborn as an online game. Research was done on several aspects of the online version. These included its effectiveness, how long the effect lasted, and whether "booster" inoculations were needed and useful. The research, unlike most social psychology experiments, used thousands of participants. These studies showed that the game had beneficial effects. Specifically, "players adjusted their ratings of fake headlines downwards by about half a point (0.5) on the 1–7 reliability scale after playing" (219). In terms of percentage change, the half point reduction "means that the game boosted people's immunity by about 20–25 percent" (219).

Given the results noted above, a vital question is how, or whether, Bad News could be applied in real world settings to generate something akin to herd immunity. The goal was "for people to have access to Bad News for free around the world" (231). Chapter ten addresses this challenge. The first step came when an agency of the British government asked whether the game could be used to counter misinformation about COVID-19. The result was a new game called "GoViral." The game was translated into multiple languages and showed positive effects: "People tested in England, Germany and France all significantly improved in their ability to discern fake from credible news posts; became more confident in their veracity assessments; and were less likely to want to share misinformation with others in their social networks" (237).

As the nature of Bad News became better known outside of academia, the team was "being approached by technology giants, such as WhatsApp, Facebook, and Google, on a regular basis" (246). These platforms are not optimal for a game-type intervention, so the team produced short videos. These videos begin with a general warning about the possibility of upcoming deceptive information. Then there is a section that "show[s] people how to spot and refute misinformation that explicitly makes use of these techniques [commonly used by deceivers] by exposing them to a series of weakened examples" (249). The results were again successful.

At this point, it appears that attempts to take the prebunking approach worldwide have had some success. The problem will always be how to get people to interact with the "vaccine" because, unlike medical vaccinations, it isn't possible to require people to play the game or watch prebunking videos. Also, the magnitude of the effects, as noted above, is far smaller than that for medical vaccinations.

The final chapter asks how to apply prebunking to "your friends and family." I found this chapter the most unconvincing in the book. For example, "you might challenge a friend to tell you whether a given headline contains the fake-expert technique" (262–263). Well, okay, you might. But this, and the other advice in this chapter, seems to require highly artificial situations.

It is important to point out that the games produced by van der Linden and others do not tell people what to believe. Rather, they focus on the techniques that promoters of misinformation use to spread that misinformation. One basic assumption is that those who provide correct information will not use the deceptive techniques used by promoters of fake news. Hence, improvements in the ability to spot such techniques and then reject the bogus information associated with them will improve the individual's ability to discriminate real from false information.

Van der Linden has taken a highly creative approach to the problem of fake news and supported it with excellent research. The writing and coverage of the relevant research is clear and concise. The author takes pains to give credit to his colleagues and students, mentioning them by name and relaying their specific contributions. However, as noted above, the size of the effects of the games is not huge. This is not a criticism of the book or the approach. It would be extremely unrealistic to expect a single behavioral "magic bullet" to be the one solution to the problem.

The one minor quibble I have concerns the notes section, which consists of almost twenty pages of nothing but undivided blocks of text containing names, dates, and short descriptions all jumbled together with no indentation indicating a new citation or comment. To find a specific reference, you have to wade through this muck, line by line, and then go to the bibliography to get the full citation.

After reading the book, I was curious to find out what Bad News is really like to play, so I went online and played it … sort of. I spent a few minutes with it and stopped. Frankly, it's boring. Now, I'm not comparing it to some mega-active, first-person, shoot 'em up game. I don't play those or any other computer games (well, okay, solitaire maybe). So, my boredom isn't due to any such comparison. It's just boring. There's no opponent—yes you get a score as you play but that was, for me, not enough to keep my interest. A future goal for the van der Linden team might be to make the game more interactive and exciting. ■

Terence Hines is professor of psychology at Pace University and author of *Pseudoscience and the Paranormal*.

UFO Whistleblowers

Mick West's sobering assessment ("UFO Whistleblowers Go to Washington," SI, November/December 2023) of the latest UFO controversies, brings to mind Yogi Berra's fitting declaration: "It's like *déjà vu* all over again." As I wrote in my article (Skeptical Inquirer, July/August 2015), "Do even rational people suspend disbelief when applied to improbable notions like UFOs if they really want to believe?" The answer is clearly yes. The first conspiracy theory I recall as a teen during the height of the flying saucer craze in the 1950s was that the "Government" was concealing the "truth" from us. Obviously not much has changed in that regard.

Like many aspiring young science nerds at the time, fueled by the promise of space travel and science fiction, I really wanted to believe that author and self-appointed flying saucer expert George Adamaski had been abducted by aliens, taken to Venus, and brought home again. The Venusian, as described by Adamaski in his bestselling 1955 book *Inside the Space Ship*, was an attractive Nordic looking female; more fuel for a teenager like me to believe!

The UFO phenomenon has resurfaced many times in the interim and yet, despite any credible supportive evidence, never seems to fully subside. Sadly, fuzzy pictures, unreliable witness reports, and countless investigations are not enough to dissuade over a third of Americans today from believing that these are alien visitations. I attribute this to a quasi-religious need among many believers for there to be a higher power or intelligence "out there" so that we are not alone in a seemingly purposeless universe. While the jury is still out on that, UFOs (or currently UAP) are no proof this is so.

Klaus R. Brasch
Flagstaff, Arizona

Women's Sports

A person's self-identification, no matter where it may fall on the gender spectrum, is their own business and not up to anyone else to dictate. Period.

However, transgender women competing in women's sports creates a dilemma: Transgender women deserve the same consideration afforded all women—but because a transgender woman has started life as a biological male, the innate physical characteristics that give men the advantage in most sports would give her an unfair edge over any biological woman competitor. Unlike life, competitive sports are supposed to be fair, all things considered.

What a relief to have this cognitive dissonance resolved when I read Robyn E. Blumner's "Postcards from Reality column," "Transgender Women in Women's Sports: What's Fair?" (SI, November/December 2023)!

Blumner's many points about the physical advantages transgender women have over biological women make it impossible to ignore the unfairness of expecting a level playing field when transgender women compete against biological women. As she suggests, instead of only two divisions—men and women—why not create additional categories to accommodate athletes who do not fall precisely into those two? That would be reasonable and fair for everyone.

It also seems there's little controversy or few complaints of discrimination over transgender men competing in men's sports, bolstering Blumner's argument that a person's biology at birth may have a lasting influence on their subsequent physical attributes. And what effect might gender reassignment treatment have on physical attributes if started at an early age, well before puberty? Would that make a difference?

All in all, transgender men and women deserve the same respect and consideration due all human beings, regardless of gender. However, it's not disrespectful to agree that no human beings are exactly the same and, in some cases, concessions should be made. It's only fair.

Linda Ferrazzara
Randolph, Massachusetts

Mental Illness and Good Intentions

It's unfortunate that "Mental Illness and the Tragedy of Good Intentions" by Stuart Vyse (SI, November/December 2023) repeats the highly erroneous common wisdom about Frederick Wiseman's documentary *Titticut Follies*. The treatment we see at Bridgewater State Hospital was consistently humane and is recommended by many medical schools even today.

Bridgewater State Hospital included residents who were so badly damaged that they couldn't even control their bowels; they were given paper "suits" to wear. And to keep the staff from inadvertently getting smeared with feces, the patients who had an "accident" were cleaned up remotely with a hose. The scene central to the film's incorrect reputation applied only to incontinent patients (not most patients), happened only when a patient had an "accident" (not every day and not for "misbehavior"), and involved warm water (not cold).

Unfortunately, the budget was so pinched they could supply only one paper suit per incontinent patient per day, rather than the recommended three. The Massachusetts administration gave Frederick Wiseman extraordinary access and commissioned *Titticut Follies* to help arm-twist the state legislature into increasing Bridgewater State's budget. But an unexpected election loss abruptly terminated that administration and brought in new players. The new administration had different priorities for spending state monies and so wanted to prevent the release of Wiseman's film. Their lawyers suggested the easiest way to make that happen was to charge Wiseman with violating privacy and tie the film up in court … and that's exactly what happened.

Chuck Kollars
Ipswich, Massachusetts

Stuart Vyse responds:

Chuck Kollars makes several claims about the film Titticut Follies *and the treatment of patients at Bridgewater State Hospital (BSH) where the film was shot, including that the treatment of patients was "consistently humane and is recommended by many medical schools even today." I could not disagree more. I have seen the film (for anyone interested, several segments from* Titticut Follies *can be found on YouTube). In addition, I spent some time working in state institutions. I do not think the conditions portrayed in the film would be supported by any reputable mental health organization today. Furthermore, although some conditions have improved at BSH since* Titticut Follies, *others have not. A forty-six-page report by the Massachusetts Association for Mental Health released in October 2023 details the long history of the institution, including that "BSH has been the site of inexcusable injury and death, including deaths attributable to the overuse of restraint" (see https://www.mamh.org/assets/files/BSH-History-10-2-23.pdf). Concerns about patient treatment at BSH have also been the subject of recent media coverage by the* Boston Herald *and WGBH.*

SECRETS REVEALED

IN THIS ISSUE ...

Connectivity Answer

Group #1: Riddler, Penguin, and Joker are supervillains who fight against Batman.

Group #2: Bat, spider, and panther are animals that inspired superheroes.

Group #3: Clark Kent, Diana Prince, and Peter Parker are alter egos to superheroes.

Theme: SUPERHEROES

Skepticross Answer

1 C	2 A	3 R	4 E
2 O	P	E	N
3 L	E	A	D
4 A	S	P	S

Peek Inside Kreskin's ESP Game from the Fun & Games Section.

Investigate the Differences Solution

When compared to the original cover (top), the alternate cover (bottom) has the following differences:

Missing parts:

1. Jersey Devil's tail
2. Nessie's handkerchief
3. Slenderman's tentacles
4. Chupacabra's arm band
5. Bottle by the tombstone
6. One Fresno Nightcrawler

Added parts:

7. Fresno Nightcrawler's smile
8. Bigfoot's toe tag
9. Bird shadows in the sky
10. Rainbow

Changed parts:

11. Text of the ribbon on the wreath
12. Color of the bow on the wreath
13. Color of the jackalope's roses
14. Color of Mothman's eyes
15. Length of Mothman's antennae
16. Birthdate on the tombstone

IN THE JAN/FEB 2024 ISSUE ...

Secrets on the Cover

Here's three secrets about the January/February 2024 SI cover:

- Little Green Men: We confess that our team had a heated debate about whether or not little green men belonged at a cryptid's funeral. As a compromise, we placed them in the least prominent position.
- Hoop Snake: The wreath doubles as the folkloric hoop snake, alluding to the topic of the first News & Comment piece in the issue.
- Poe Toaster: The jackalope's roses and the nearby bottle are a reference to the "Poe Toaster," a secret person who placed this tribute every year on Edgar Allan Poe's grave. This reference alludes to Poe's murder mystery at the center of Joe Nickell's column in the issue. (Hint: Edgar Allan Poe also inspired another secret in the same issue of SI.)

Secrets from FUN & GAMES Section

The Fun & Games section included this clue: "One page in this issue of Skeptical Inquirer has seven hidden 'Easter Eggs.'" The clue hinted at the News & Comment piece about numerology, titled "Guidance from a Numerologist," that ended with a reference to the number seven and contained these seven hidden references:

1. The title of the article contains seven words.
2. The first word of the title begins with "G," the seventh letter of the alphabet.
3. The first paragraph includes "left field," the seventh position on a baseball diamond.
4. The second paragraph includes "Burgundy," the color of the seven-ball in pool.
5. The third paragraph includes "diligence," the virtue opposing the seventh deadly sin (sloth).
6. The fourth paragraph includes "Libra," the seventh zodiac sign.
7. The piece appears on page 7.

Secrets from the FUN & GAMES Section and the SECRETS REVEALED Section

The Fun & Games section includes a coded poem written in "secret writing," and the Secrets Revealed section alludes to that same code with some redacted information. Also revealed is the fact that the code hides information leading to "a prize for the first person to fully solve the riddle and email the solution as a Letter to the Editor." And here's another secret: the prize has yet to be claimed.

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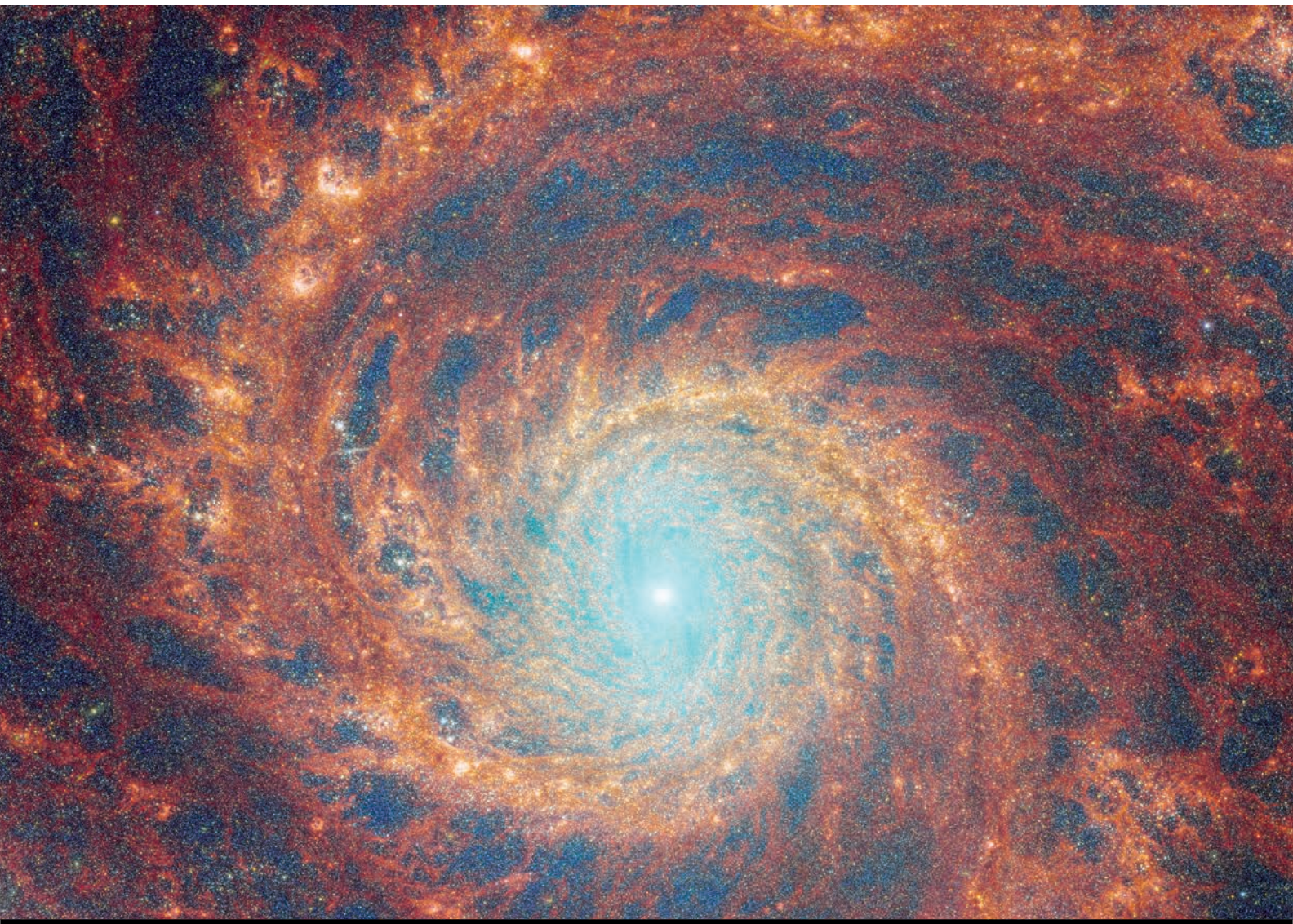

Whirlpool Galaxy (Messier 51): A FEAST for the Eyes. The first spiral galaxy to be classified is thirty-two million light-years away. A nearby dwarf galaxy may be helping to create the whirlpool effect. The Feedback in Emerging extrAgalactic Star clusTers (FEAST) program studies stellar nurseries in other galaxies. This composite image comes from NASA's James Webb Space Telescope by combining data from the MIRI and NIRCam instruments.

Credit: ESA/Webb, NASA & CSA, A. Adamo and the FEAST JWST team